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ABSTRACT

This study examined the changing social and economic impact of college attendance in Pennsylvania between 1980 and 1990. It is based on a sample of over 500,000 census interviews. The study found that, in general, individuals who attended and finished college will marry other individuals who went to college, and that both parents will work and together earn more than $40,000 annually. Their income will permit them to live in a community that aggressively invests in the learning and cultural environment. They will raise children who will have a high probability of earning college degrees, thereby perpetuating a cycle of prosperity. Conversely, parents who do not have a college education will earn less and will more likely live in communities that have limited capacity to invest in the development of their youth. These parents will raise children who will have a much lower probability of earning college degrees, thereby perpetuating a cycle of disparity. To encourage college attendance, the report recommends that Pennsylvania establish state-wide education objectives, gather and disseminate critical information, reexamine higher education's price curve, provide investment incentives for families, provide incentives for employers and develop an education/labor force policy, and facilitate change among institutions and sectors. (MDM)

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ED 387 057

HIGHER EDUCATION PARTICIPATION:

THE KEY TO ACHIEVING A COMMONWEALTH OF OPPORTUNITY

Pennsylvania Independent College
And University Research Center

HE 027 639

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Table of Contents

Executive Summary	5
Preface	9
The Importance of Education	11
Measuring Basic Attainment	13
Education and Income	16
Education and the Family	19
The Demographics of Enrollment	24
The Dynamics of Education Participation	26
Labor Markets and Education	36
Education and Pennsylvania's Future: Six Policy Recommendations	40

Additional copies of this report are available for $5.00 each from the Pennsylvania Independent College and University Research Center, 800 North Third Street, Harrisburg, PA 17102. Telephone: 717/232-8649. Checks should be made payable to PICURC.

Acknowledgments

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Executive Summary

Conducted by the Pennsylvania Independent College and University Research Center (PICURC), this study measures the changing social and economic impact of college participation in Pennsylvania during the past decade, focusing on age, gender, and race; family composition; personal and family income; and labor force participation. The report was drawn from major data stocks produced by federal and state sources, including the Decennial Census, which enabled the investigators of this study to explore the social and economic characteristics of Pennsylvania residents based on a sample of more than 500,000 completed interviews.

In general, PICURC found that individuals who attend and finish college will marry other individuals who went to college. Both parents will work and together will earn more than $40,000 annually, staying ahead of inflation. Their income will permit them to live in a community that aggressively invests in the learning and cultural environment. They will raise children who will have a high probability of earning college degrees, thereby perpetuating a cycle of prosperity.

Conversely, parents who do not have a college education will earn much less, losing ground to inflation, and will be more likely to live in communities that have limited capacity to invest in the development of their youth. These parents will raise children who will have a much lower probability of earning college degrees, thereby perpetuating a cycle of disparity.

Alarmingly, 55 percent of all children age 18 or younger currently live in families whose household head has no college education and more than 15 percent live with parents who have not completed high school. In other words, a substantial majority of Pennsylvania's youth are educationally disadvantaged.

Measuring Participation: 1980 to 1990

Although Pennsylvania made significant progress from 1980 to 1990, education gains were primarily concentrated at the lower end of the spectrum: a reduction in the number of high school dropouts, significant growth in the number who have attained at least some college education, and more modest gains in the number receiving bachelor's degrees.

Indeed, most of Pennsylvania's higher education gains have been made by adults age 30 or older. Between 1980 and 1990, Pennsylvania's adult college participation rate increased by more than 50 percent, and for men and women age 35 and older, the proportion attending college more than doubled. While college participation increased for men and women of all ages, women outpaced men. Notably, women between the ages of 35 and 54 are nearly twice as likely to be enrolled in college as men.

Although more adults are attending college, the chances of attending diminish greatly if a person has not gained at least some college experience by age 29. In 1990, fewer than one-in-fifty 30-year-olds who only had a high school education were enrolled in college. By contrast, nearly one-in-five 30-year-olds who had at least some college, an associate's degree, or a bachelor's degree were enrolled.

While most segments of Pennsylvania's adult population made progress during the past decade, education disparities by ethnic/racial group remained or widened. For example, in 1980, a white male age 25 to 29 was 127 percent more likely to have a bachelor's degree than a black male in the same age group. By 1990, the disparity increased to 167 percent.

Education and Income

From 1980 to 1990, the wages of Pennsylvania men, age 25 to 34, who had a bachelor's degree rose 5 percent after accounting for inflation, while wages for men who had only a high school diploma fell 13 percent.

A Pennsylvanian who has a bachelor's degree typically earns between 30 and 50 percent more than someone who only has a high school diploma, and Pennsylvanians with advanced degrees earn about 20 to 30 percent more than those with bachelor's degrees.

Education and the Family

Individuals tend to marry within the same educational class, which strongly influences a family's economic well being and social class. In 1990, fewer than one-in-fourteen Pennsylvania women with a high school diploma or less were married to men with a bachelor's degree or higher. Similarly, among women with at least a bachelor's degree, fewer than one-in-four were married to men who had not attended college. In effect, this pattern of family formation concentrates society's higher education investment among relatively few families.

The odds of achieving or retaining middle-class status without one or both spouses earning a bachelor's degree are declining. The estimated per capita income for couples who both have college degrees is $19,613, compared to $10,090 for couples who are both high school graduates.

A majority of Pennsylvania families managed to maintain their standard of living during the 1980s largely because more women joined the labor force. In 1979, Pennsylvania women contributed 17 percent to family income, compared to 25 percent in 1989. However, the rise in two-earner families is slowing down, because the majority of men and women are already employed, and the number of single-parent families has grown from 18 percent in 1980 to more than 30 percent in 1991.

High School Graduation and College Participation

Although the chances of attending college depend heavily on parental education and family income, the most important determining factor is the completion of high school. In fact, differences in college enrollment among low- and middle-income dependents are largely accounted for by differences in high school dropout rates.

For example, in 1990, a dependent from a family with an income under $15,000 was nearly four times more likely to drop out of high school as a dependent from a family with an income of $60,000; yet, among high school graduates, about 60 percent of **both** groups went on to attend at least some college. In other words, high school graduation is a more fundamental determinant of access to college than the cost of college attendance or the availability of financial aid.

Between 1983 and 1993, the proportion of Pennsylvania high school graduates who planned to attend college increased dramatically from 48 percent to about 67 percent. The clear linkage between a college degree and a better job explains much of the growth. During the next two decades, increasing secondary school enrollment, combined with increased college aspirations and increased adult college participation, may tax the state's ability to accommodate all of its qualified college students.

Education and Employment

The employment of individuals who have a bachelor's degree or higher is concentrated among relatively few major industry sectors. In 1990, 50 percent of all Pennsylvanians with a bachelor's or advanced degree were employed by three major industry groups: health, education, and public administration. By contrast, 35 percent of those with a high school diploma or less were employed in two major sectors: manufacturing and retail trade.

Since 1989, employment in the manufacturing industry, where only 15 percent of employees have a bachelor's degree or higher, has dropped nearly 10 percent. During the same period, the payroll per worker in the transportation, communication, and public utilities industry, where 12 percent of employees have a bachelor's degree or higher, has fallen at an annual average rate of 1 percent. In other words, employment and/or income declines in these industries, which have traditionally paid high salaries to less educated employees, are literally pulling the rug from under a large number of Pennsylvania's blue-collar workers.

Meanwhile, nearly all of the industries in Pennsylvania that employ more highly educated workers have raised average earnings and added more jobs since 1987.

Meeting the Challenge

Participation and education attainment are two sides of the same coin. Those who have attained at least some college education are the most likely to receive additional instruction, either on their own or through their employers, which also induces future participation by other family members. Once individuals begin college, they become the most likely candidates for life-long learning. Unfortunately, however, large education gaps exist among Pennsylvania's economic classes, a disparity that must be addressed if we are to expand educational opportunities for the state's existing population and spur greater participation by future generations. To close these gaps:

- The state should consider establishing long-range education objectives and determine the level of investment that will be needed to achieve these objectives.

- Education institutions and employers should collaborate to develop an information infrastructure that will provide educators and policy makers with a better understanding of the skills employers require and that will better measure the economic outcomes of students following graduation.

- Pennsylvania should establish a higher education price curve and subsidization strategy that maximizes the state's return on its higher education investment.

- Because of the positive relationship between high school graduation and subsequent higher education, the state should encourage programs that enhance early educational success.

- Investment incentives, such as a college savings income tax credit for families or a tuition reimbursement credit for employers, should be explored.

In combination, these policy thrusts would redefine the Commonwealth's education landscape, encourage wider participation in postsecondary education, and ultimately ensure greater economic and social mobility for Pennsylvania's citizens.

Preface

This study measures changes in the education attainment and college participation of Pennsylvanians during the past decade by focusing on four social and economic dimensions:

1) Race, age, and gender;
2) Family composition and household formation;
3) Personal and family income and average hourly earnings; and
4) Labor force participation, occupation, and industry of employment.

The study draws from five major data stocks produced by federal and state sources: The 1990 Pennsylvania Public Use Microdata Sample, the Integrated Postsecondary Education Data System's Enrollment Series, the Pennsylvania Department of Education's High School Senior Survey, County Business Patterns, and the Pennsylvania Higher Education Assistance Agency's Year-by-Year Summary Statistics and Economic Impact Reports to the Presidents. Additional data were drawn from the Current Population Survey, the National Center for Health Statistics' Natality Reports, U.S. Bureau of the Census population projections, and on-line data from the Pennsylvania State Data Center.

The analysis focuses primarily on the period from 1979 to 1993. For the purposes of measuring family and personal income, the analysis relies heavily on data from 1979 to 1989, which represents a period of robust economic growth for Pennsylvania and the nation. Since 1989, national median family income has steadily fallen, and Pennsylvania's median family income is currently $30,946, or 7 percent below its 1989 peak. Therefore, the 1979 to 1989 income trends observed in this study understate the severity of Pennsylvania's wage stagnation.

For all the social and economic benefits derived from an education, measuring attainment is both crude and elusive. At a state or regional level, measurement relies on general population surveys, because no institution periodically monitors and reports on the whereabouts and education status of all residents. Therefore, the collection of attainment data is based extensively on self-reporting mechanisms, and when compared with actual transcript data, survey respondents demonstrate a general tendency to overstate their credentials. As a result, the trends in attainment observed in this study may exaggerate actual progress. In measuring education attainment changes, the 1980 to 1990 data track the state's baby boomer cohort during the early stages of college enrollment and family formation.

A census-based analysis of college participation is also limited, because it is not possible to link a large number of college-age dependents who live away from home while attending college with their family records. Consequently, information about the family income or parental education of approximately 130,000 dependent students between the ages of 18 and 23 is not available. According to National Postsecondary Student Aid Study data, the income of families whose college dependents do not live at home is substantially higher on average than the income of families whose college dependents are household residents, which suggests that the exclusion of nonresident students from this analysis understates the disparity in college attendance rates by family income and parental education.

Finally, due to the redesign of the 1990 census questions pertaining to education attainment, it was not possible to match the definitions and categories directly with prior census data. To accommodate the change in census definitions from 1980 to 1990, this

9

study uses the following cross-walk (see Appendix A for a more detailed discussion of census definitions):

1980 Years of Education	1990 Highest Level Attained
Less than 12 Years	High School Dropout
12 Years	High School Graduate
13 to 15 Years	Some College/Associate's Degree
16 to 17 Years	Bachelor's Degree
18 Years or more	Advanced Degree

The Decennial Census is the most comprehensive information source available for examining the relationships among education attainment and other measures of social and economic well being. Based on a survey of approximately one-of-six Pennsylvania households, the census long form and its derivative Public Use Microdata Sample (PUMS) enabled the investigators of this study to explore the social and economic characteristics of Pennsylvania residents based on a sample of more than 500,000 completed interviews.

The Importance of Education

In 1993, the United States invested more than $500 billion in education and employment-related training, or approximately $2,000 for every man, woman, and child in the country. These public and private dollars enabled students to spend more than 50 billion hours in formal classroom or laboratory instruction.

Pennsylvania's commitment to education has also been extraordinary. During the past decade, Pennsylvania directly or indirectly invested more than $50 billion in education, including $40 billion for elementary and secondary education, $10 billion for higher education institutions, and more than $1.3 billion for need-based student financial aid. To help finance the cost of college attendance, Pennsylvania families borrowed more than $7 billion during the past ten years. Each year, more than one-in-four Pennsylvanians are enrolled in an elementary or secondary school or an institution of higher education. Although data is not available on the number of employees who receive employer-sponsored training annually in Pennsylvania, more than one-in-three employees receive formal training each year nationally, which suggests that more than two million employees receive annual training in the Commonwealth.

While education can be valued at many levels, a central motivation for educational investment stems from the salutary economic and social returns. After the family, our education system is the most important social institution in terms of shaping and developing personal values, inculcating a sense of civic responsibility, and imparting the knowledge and technical skills that drive our economy.

Education greatly determines an individual's position and worth in the labor market. As Pennsylvania's economic base becomes increasingly internationalized, the skills and knowledge of its work force may become the single most important component of the state's economic infrastructure and the primary basis for ensuring sustained economic growth. Without a highly skilled and continuously developing work force, Pennsylvania will inevitably face a declining standard of living as improved technology and increased skill attainment by workers in competing states or nations continues to reduce the importance of distance to market, the cost of materials, and the value of manual labor.

Education also serves as a social-class sorting mechanism, and the influence of attainment in determining an individual's social standing is growing. In the labor market, education is the most common employment screening device, making academic achievement a basic standard of candidacy for a growing number and proportion of all jobs. With respect to household formation and social interaction, our education influences who we work with, who we marry, and who our neighbors are.

In contrast with prior decades, higher education is now crucial to earning a sustainable wage. Without a postsecondary education, an individual's economic and social mobility are severely restricted, because our society does not have an alternative system for teaching the knowledge and skills that are necessary to succeed in today's economy. Therefore, the attainment of a higher education is vital to the preservation of personal choice and self-determination.

In other words, across a wide range of social and economic measures of well being, people who have a higher education are better off and are more likely to pass the benefits on to their children. Individuals with a higher education are more likely to own a home, less likely to receive public assistance or live below the poverty threshold, more likely to be civically active, and more likely to maintain a stable family environment. Fundamentally, the benefits of education are contagious, affecting the education and productivity of

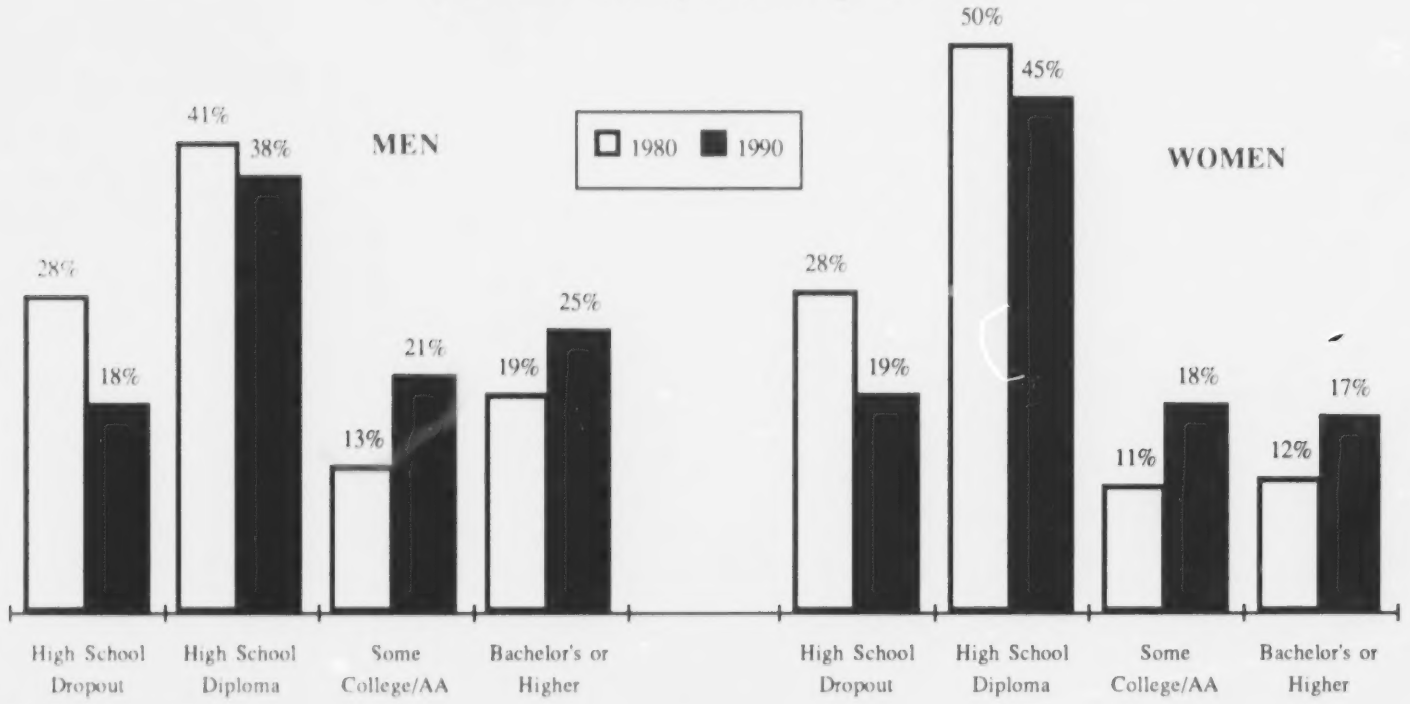
spouses, children, and employers. In this respect, education investments are more dynamic than most other infrastructure investments.

While the United States has historically guaranteed the right to an elementary and secondary education and virtually assured college access for those who are academically qualified, the patterns of college participation and attainment, both within and between generations, have become more systematic. To the extent that educational progress is limited by the economic condition and education of a person's immediate family, the ideal of a truly egalitarian education system is being challenged.

Measuring Basic Attainment: 1980 to 1990

Although Pennsylvania made significant progress from 1980 to 1990, education gains were primarily concentrated at the lower end of the attainment spectrum: a reduction in the number of high school dropouts, significant growth in the number of individuals who have attained some college education, and more modest gains in the number receiving bachelor's degrees. Indeed, most of Pennsylvania's higher education gains have been made by adults, especially women, age 30 or older. Among men and women age 29 or younger, attainment levels have remained relatively unchanged or have declined, reflecting the general trend toward part-time enrollment and longer completion times.

Education of Pennsylvanians Age 25 to 64

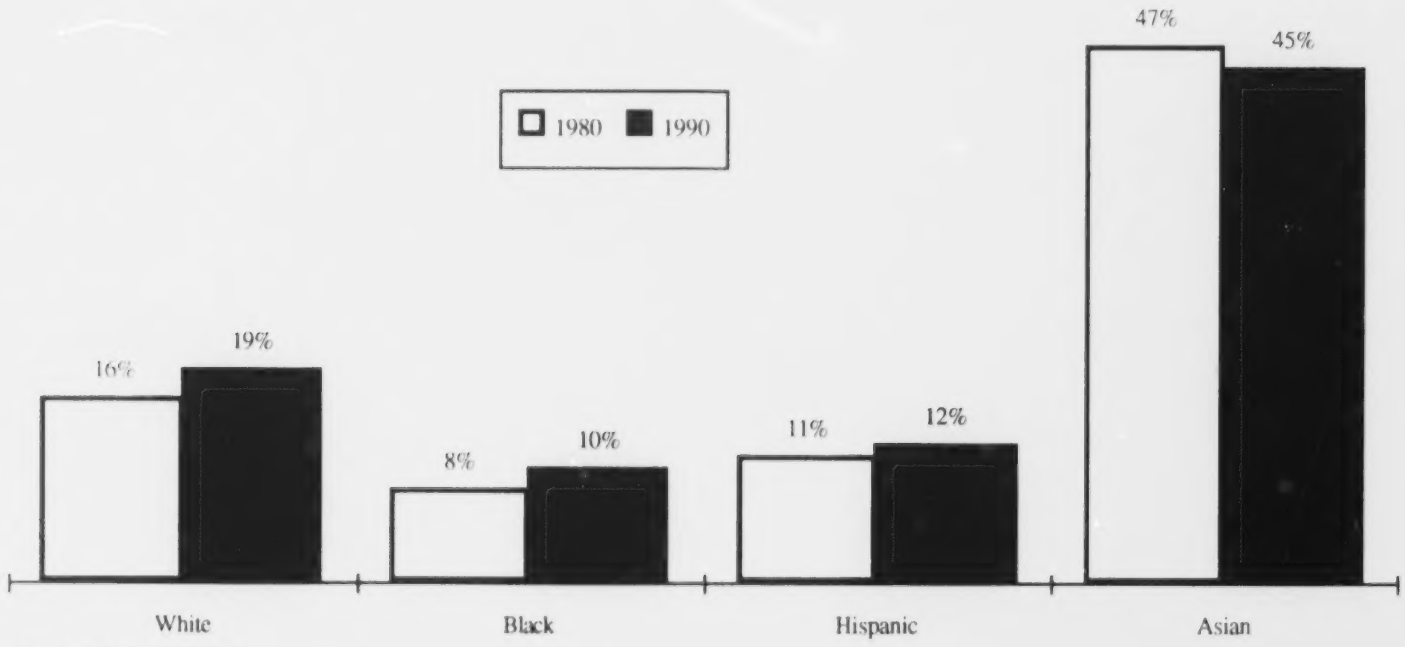


Source: U.S. Census Bureau

13

While most segments of Pennsylvania's adult population made progress during the last decade, disparities in attainment by ethnic/racial group either remained or widened. For example, in 1980, a white male age 25 to 29 was 127 percent more likely to have a bachelor's degree than a black male in the same age group. By 1990, the disparity increased to 167 percent.

Pennsylvanians Age 25 to 64 who Have a Bachelor's Degree or Higher by Racial/Ethnic Origin



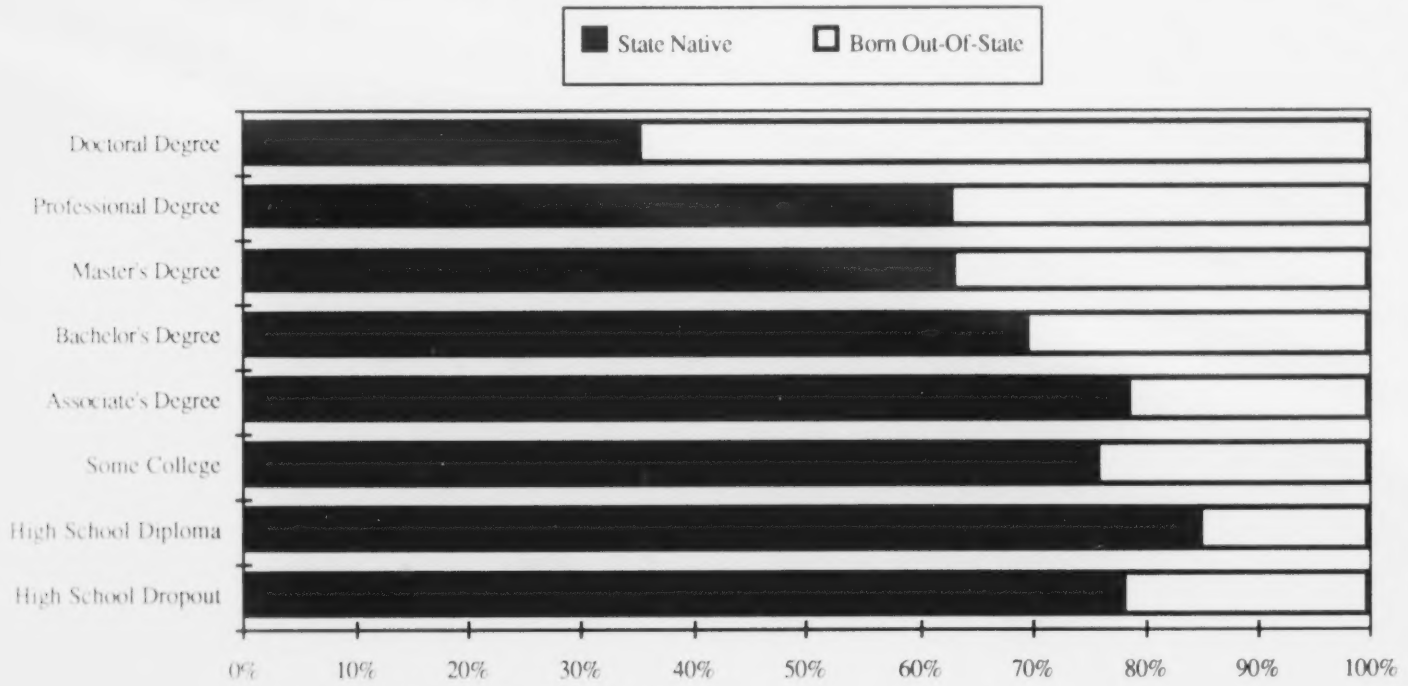
Source: U.S. Census Bureau

Advanced Education

While the proportion of adults who earned graduate degrees nearly doubled between 1980 and 1990, fewer than one-in-twenty Pennsylvanians have a graduate or professional degree, and the distribution of advanced degrees is sharply differentiated by ethnic/racial group. Less than one-in-twenty whites and less than one-in-thirty blacks have advanced degrees, compared to nearly one-in-five Asians.

As a result, Pennsylvania is dependent on migration to meet its highly skilled labor needs. For example, in 1990, fewer than one-half of those who had advanced degrees in Pennsylvania were native residents, and of those who had a Ph.D., only one-in-three were Pennsylvania natives.

Geographic Origin of Pennsylvanians by Education: 1990



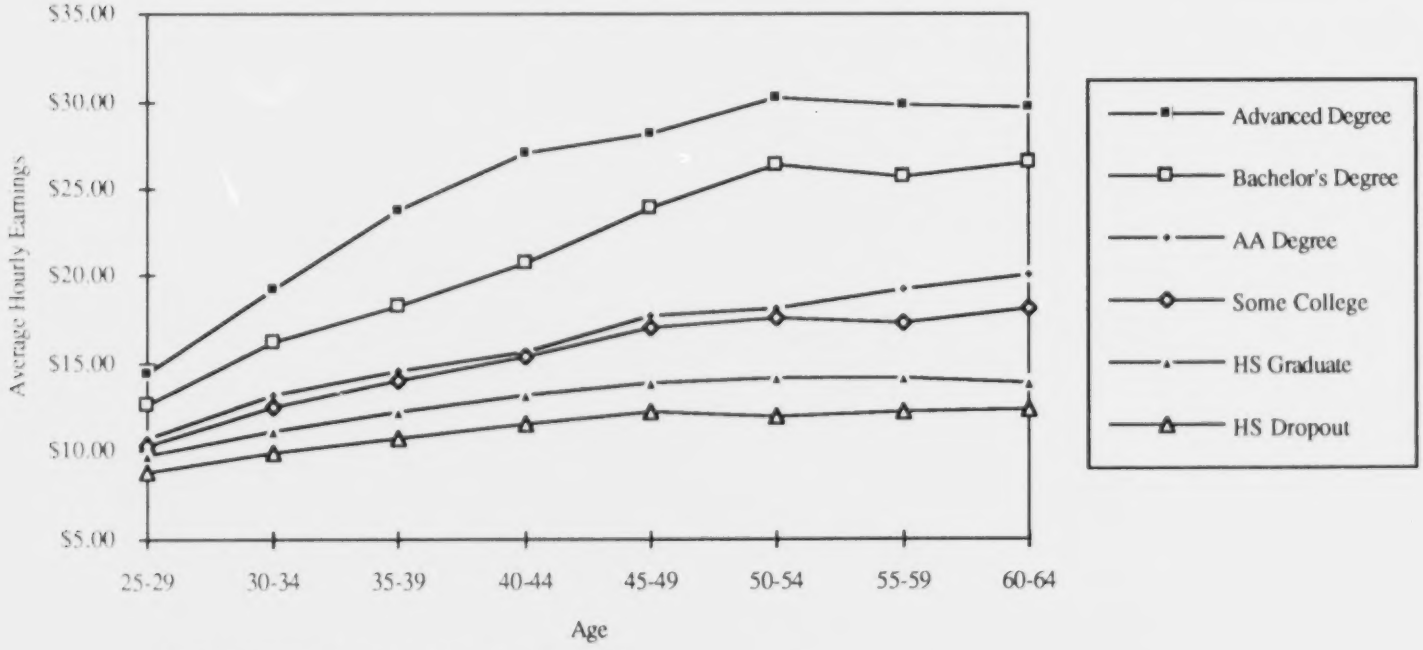
Source: Pennsylvania Public Use Microdata Sample (1990)

Education and Income

Pennsylvania's Age-Earnings Profile

Education has a positive and significant effect on an individual's wage and salary income. A Pennsylvanian with a bachelor's degree will typically earn between 30 and 50 percent more than one who only has a high school diploma, and Pennsylvanians with advanced degrees will earn about 20 to 30 percent more than those with bachelor's degrees.

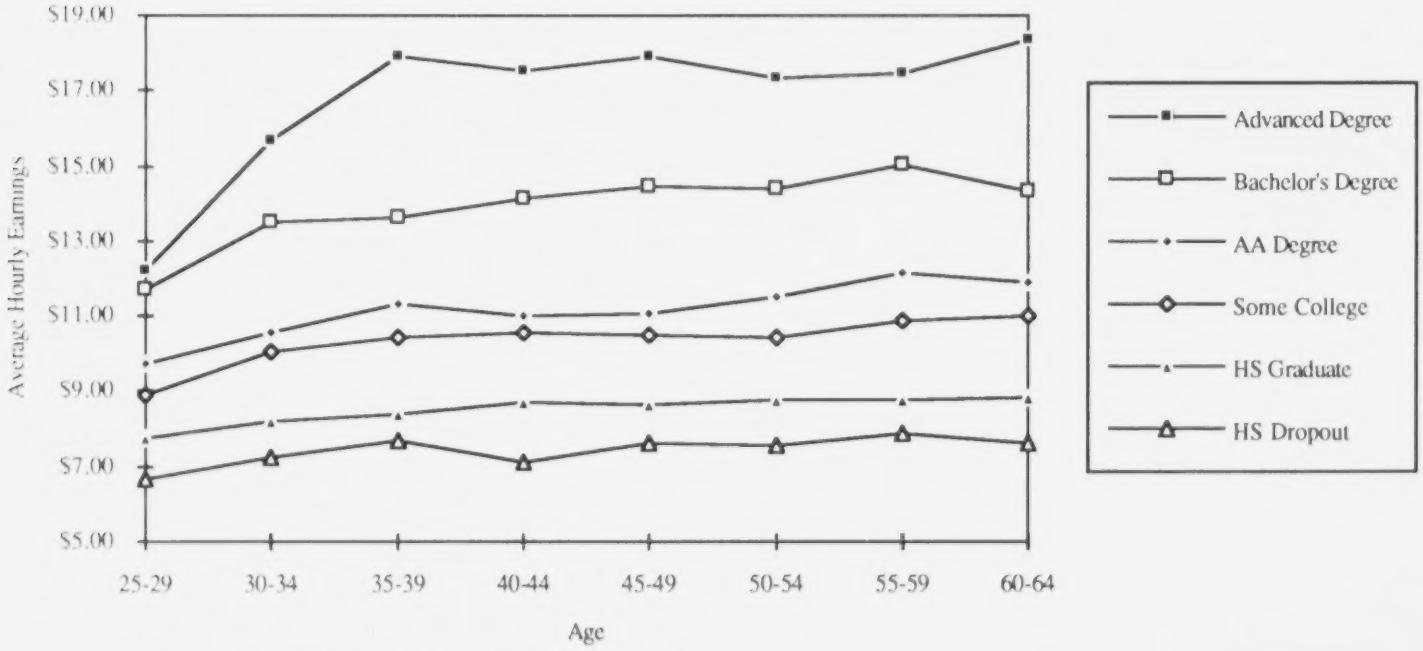
Age-Earnings Profile for Pennsylvania Males by Education: 1989



Source: Pennsylvania Public Use Microdata Sample (1990)

While education figures significantly in a person's age-earnings profile, so does gender. After controlling for an individual's age and education, Pennsylvania men typically earn 25 to 50 percent more than women. In addition, male earnings increase steadily through age 59, while female earnings remain essentially flat after age 35. Coupled with the pronounced gender difference in labor force participation rates, the wage disparity between men and women has resulted in a staggering personal income gap. In 1989, nearly 45 percent of all working Pennsylvania women age 25 to 64 had personal incomes under $10,000, compared to less than 15 percent of men.

Age-Earnings Profile for Pennsylvania Females by Education: 1989



Source: Pennsylvania Public Use Microdata Sample (1990)

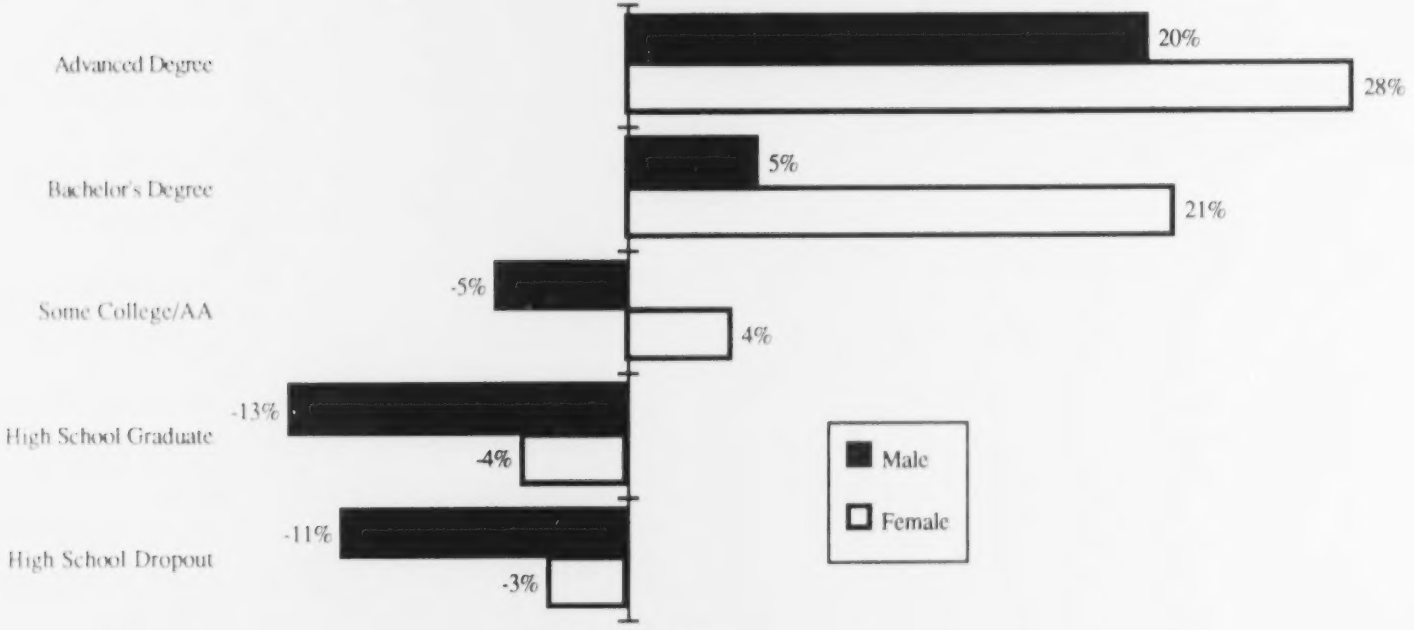
22

21

Change in Real Earnings: 1980 to 1990

While education levels increased considerably during the 1980s, median income rose only modestly during this period. Underlying this education/earnings paradox is a major shift in the structure and distribution of income in the United States. For more than two decades, constant dollar earnings have declined for a majority of industries. For individuals with some college education, wages have barely kept pace with inflation, and for those with no college education, real earnings have been in a virtual free fall. Consequently, Pennsylvania's education gains have primarily served to offset income declines rather than to achieve real gains. At the same time, the income gap between those with and without at least a bachelor's degree is widening both in Pennsylvania and the nation.

Change in Earnings after Inflation for Pennsylvanians Age 25 to 34 by Education: 1980 to 1990



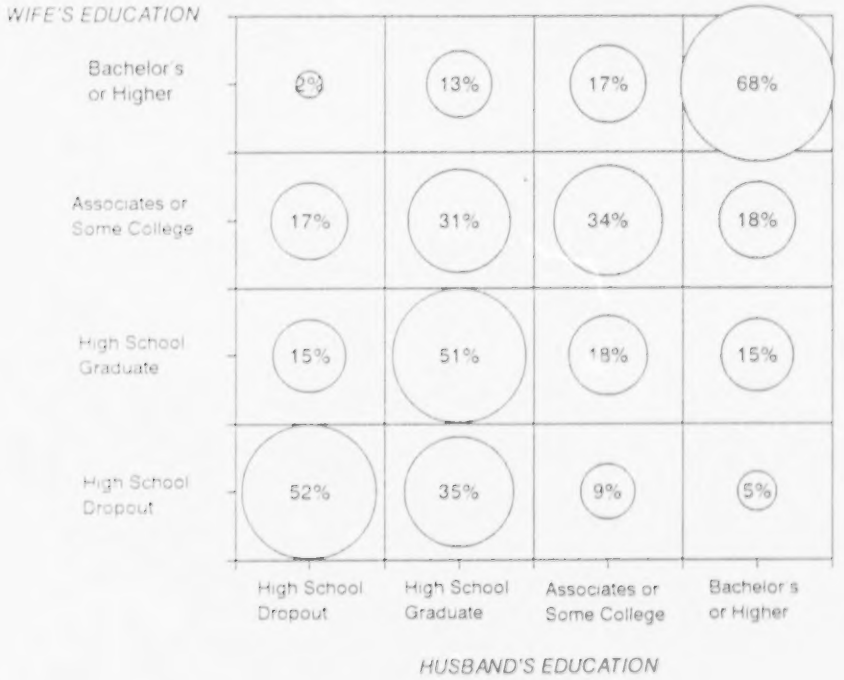
Source: U.S. Census Bureau

Education and the Family

Family Formation

Education significantly affects family formation patterns both directly and indirectly. For example, household heads with higher levels of education tend to have children later in life and are more likely to have fewer children. More significantly, individuals tend to marry within the same educational class, which strongly influences a family's economic well-being and social class. In 1990, fewer than one-in-fourteen Pennsylvania women with a high school diploma or less were married to men with a bachelor's degree or higher. Similarly, among women with at least a bachelor's degree, fewer than one-in-four were married to men who had not attended college. In effect, this pattern of family formation, which has remained unchanged for at least a decade, concentrates society's investment in higher education among relatively few families.

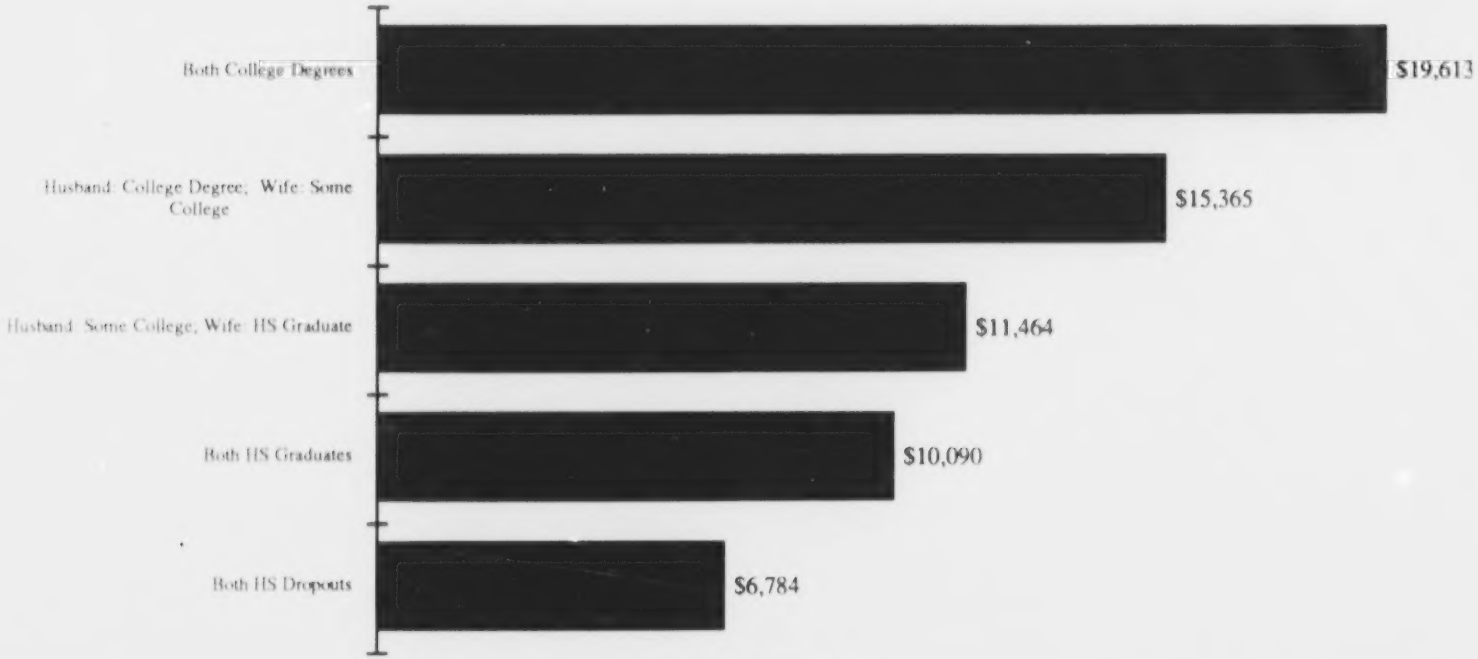
Distribution of Married Pennsylvania Women By Own and Spouses Education Attainment: 1990



Family Income

Family formation patterns also profoundly affect the level and distribution of family income in Pennsylvania. Because labor force participation rates and real earnings increase as education increases, the tendency to marry within one's educational class further exacerbates differences in family income. Stated more directly, the odds of achieving or retaining middle-class status without one or both spouses earning a bachelor's degree are declining, while income disparity among households is becoming more pronounced.

Estimated per Capita Income for Married-Couple Families by Education: 1989



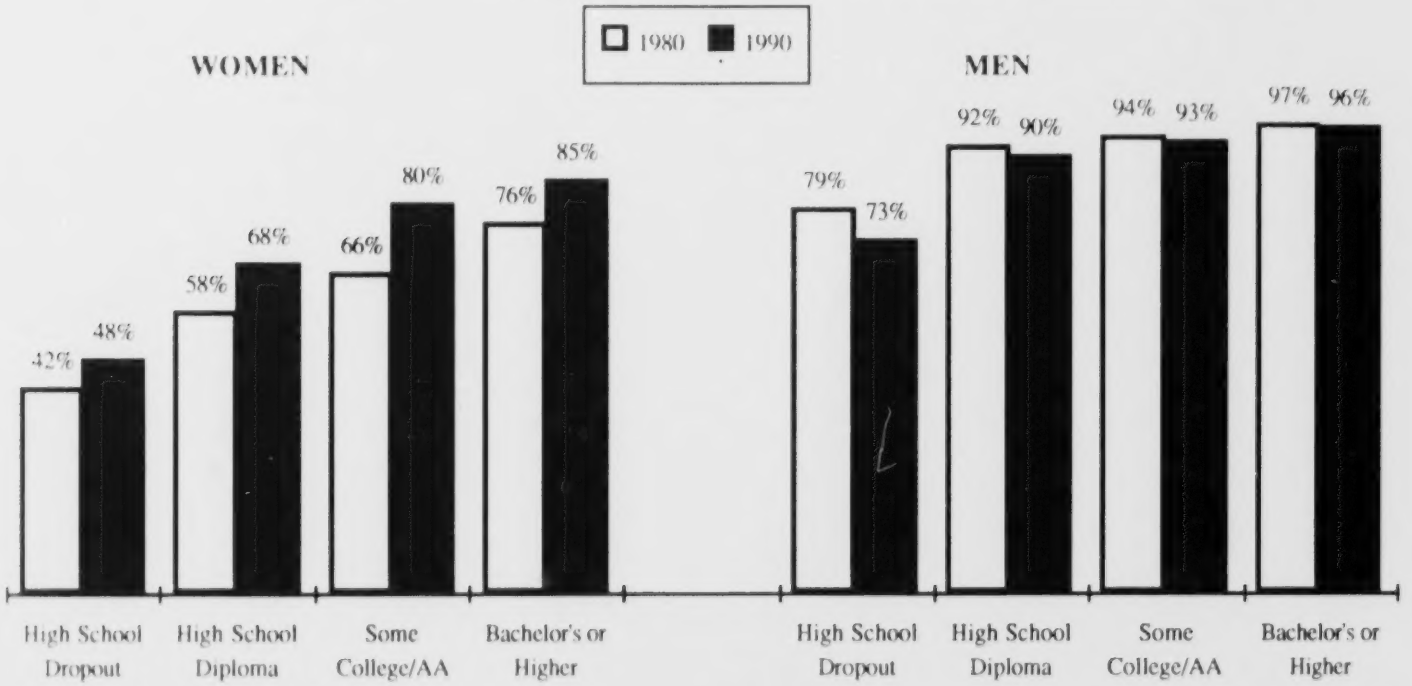
Source: Pennsylvania Public Use Microdata Sample (1990)

25

27

Despite this pattern of formation, a majority of Pennsylvania families managed to maintain their standard of living during the 1980s largely because more women joined the labor force and offset the real decline in wages for men who did not have a bachelor's degree. In 1979, Pennsylvania women contributed 17 percent to family income, compared to 25 percent in 1989. However, the rise in two-earner families is slowing down, because the majority of men and women are already employed, and the number of single-parent families has grown from 18 percent in 1980 to more than 30 percent in 1991.

Pennsylvania Adult Labor Force Employment Rates by Education



Source: Pennsylvania Census of Population

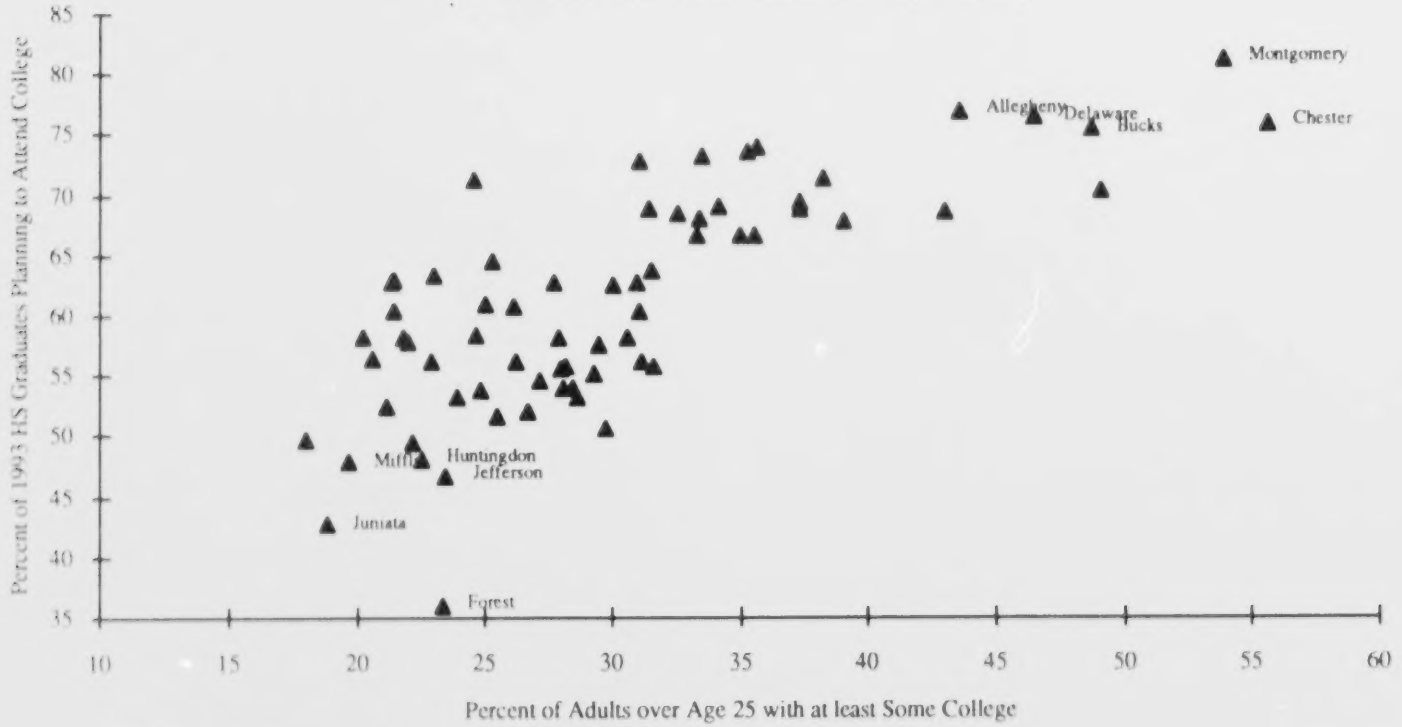
23

30

Future Generations

Family formation and income patterns have significant bearing on the education of future generations. Stated in simplistic, but statistically defensible terms, individuals who attend and finish college will marry other individuals who went to college. Both parents will work and together will earn more than $40,000 annually, staying ahead of inflation. Their income will permit them to live in a community that aggressively invests in the learning and cultural environment. They will raise children who will have a high probability of attaining college degrees, thereby perpetuating the cycle. Conversely, a family with no college education is more likely to live in a community that has a limited capacity to invest in the development of its youth, thereby perpetuating the cycle of disparity.

Relationship between Planned College Participation of High School Graduates and Adult Education by County



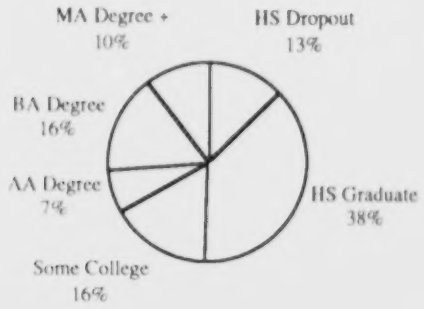
Source: Pennsylvania Department of Education and U.S. Census Bureau

31

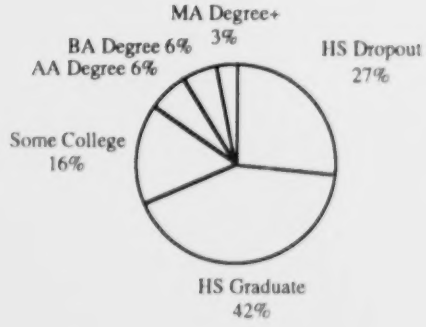
32

Indeed, the composition of Pennsylvania's young families implies that difficult challenges lie ahead. Fifty-five percent of all children age 18 or younger live in families whose household head has no college education and more than 15 percent live with parents who have not completed high school. In other words, Pennsylvania's educationally disadvantaged youth constitute a majority.

Children Under 18 Living with Two Parents by Household Head's Education: Parents Age 25 to 64 (Population: 2,093,972)



Children Under 18 Living with a Single Parent by Parent's Education (Population: 512,559)



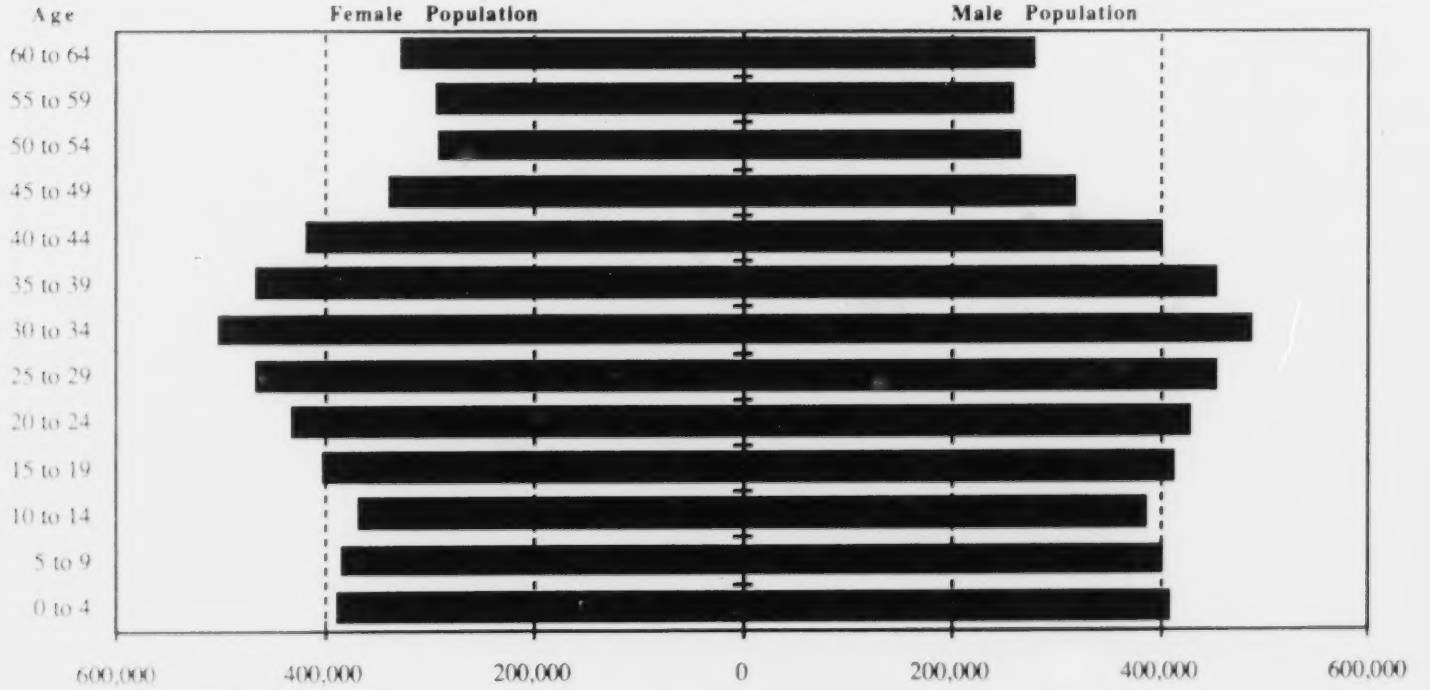
Source: Pennsylvania Public Use Microdata Sample: 1990 Census

The Demographics of Enrollment

Because college and labor force participation, income, and family formation are all strongly related to a person's age, Pennsylvania's age distribution exerts a strong influence on aggregate demand for education and the state's overall capacity to invest in education. Perhaps the most significant feature of Pennsylvania's age distribution is an emerging inverted pyramid that consists of proportionately fewer children and young adults and a burgeoning population of baby boomers who are now in their 30s and 40s. Coupled with Pennsylvania's low migration rate, the inverted pyramid suggests that Pennsylvania's labor force will grow very slowly during the next two decades, with 80 percent of the work force for 2010 already employed.

This age distribution further suggests that the large number of nontraditionally aged students who filled college classrooms during the last decade may begin to decline as a majority of baby boomers approach their 40s and 50s. At the same time, the children of boomers, now in their teen years, have contributed to rising secondary school and college enrollments, but in fewer numbers than their parents.

Pennsylvania Population by Age Group and Gender

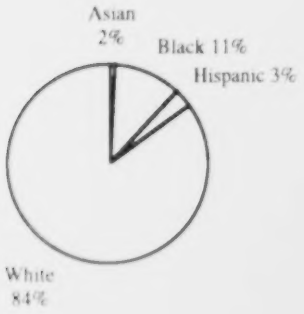


Source: 1990 Census of Population

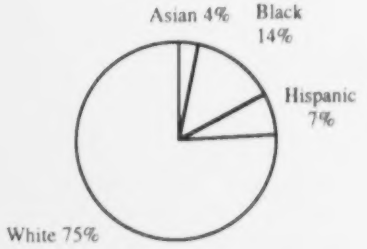
Racial/Ethnic Demographics

As the age distribution of Pennsylvania's population evolves, so too will the distribution by racial group. While the Commonwealth's population will remain overwhelmingly white, the proportion of whites will steadily decline. For example, among teenagers age 15 to 19, persons of color are expected to increase from 15 percent in 1990 to 24 percent by 2020.

Composition of 15 to 19 Year Old Pennsylvanians: 1990 (Population: 836,973)



Projected Composition of 15 to 19 Year Old Pennsylvanians: 2020 (Population: 857,875)

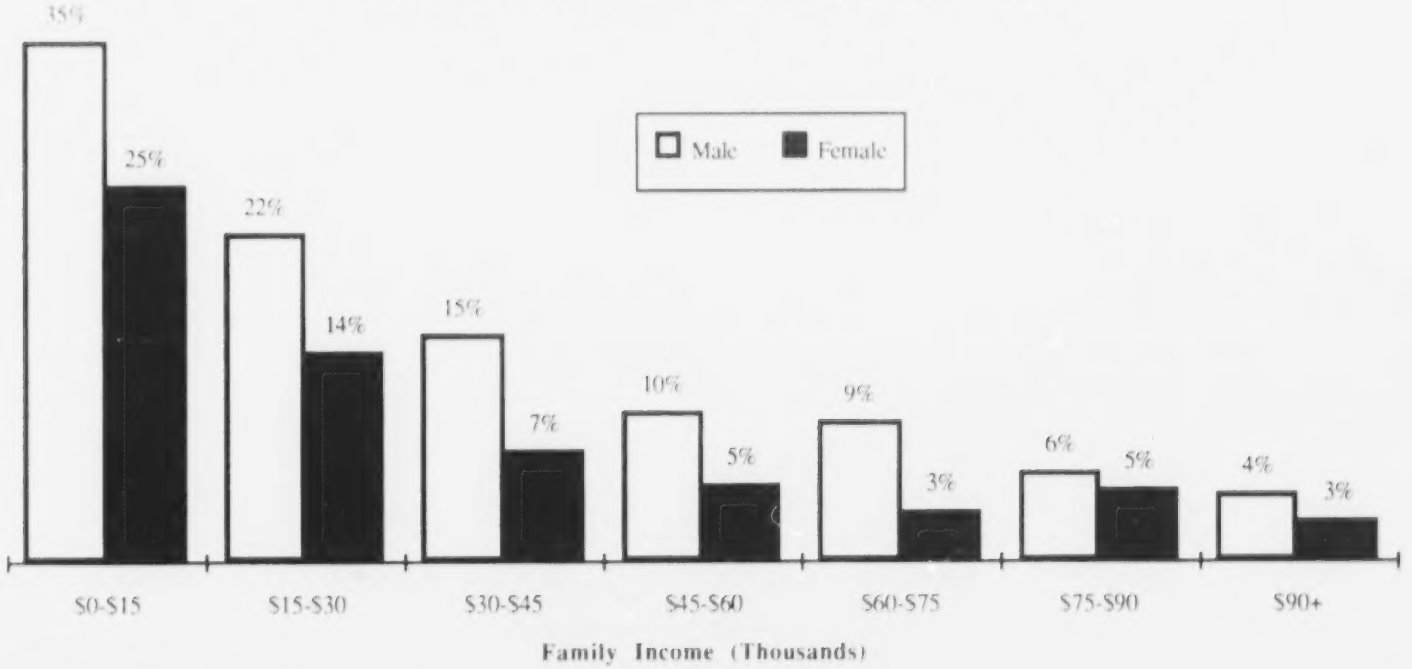


Source: U.S. Census Bureau

Traditional Participation: High School Graduation

Although the chances of attending college depend heavily on parental education and family income, the most important determining factor is the completion of high school. In fact, differences in college enrollment among low- and middle-income dependents are largely accounted for by differences in high school dropout rates. In 1990, for example, a dependent from a family with an income under $15,000 was nearly four times more likely to drop out of high school as a dependent from a family with an income of $60,000; yet, among high school graduates, about 60 percent of **both** cohorts go on to attend at least some college. In other words, educational success at the elementary and secondary level is a more fundamental determinant of college access than the cost of college attendance or the availability of financial aid, which principally affect institutional choice.

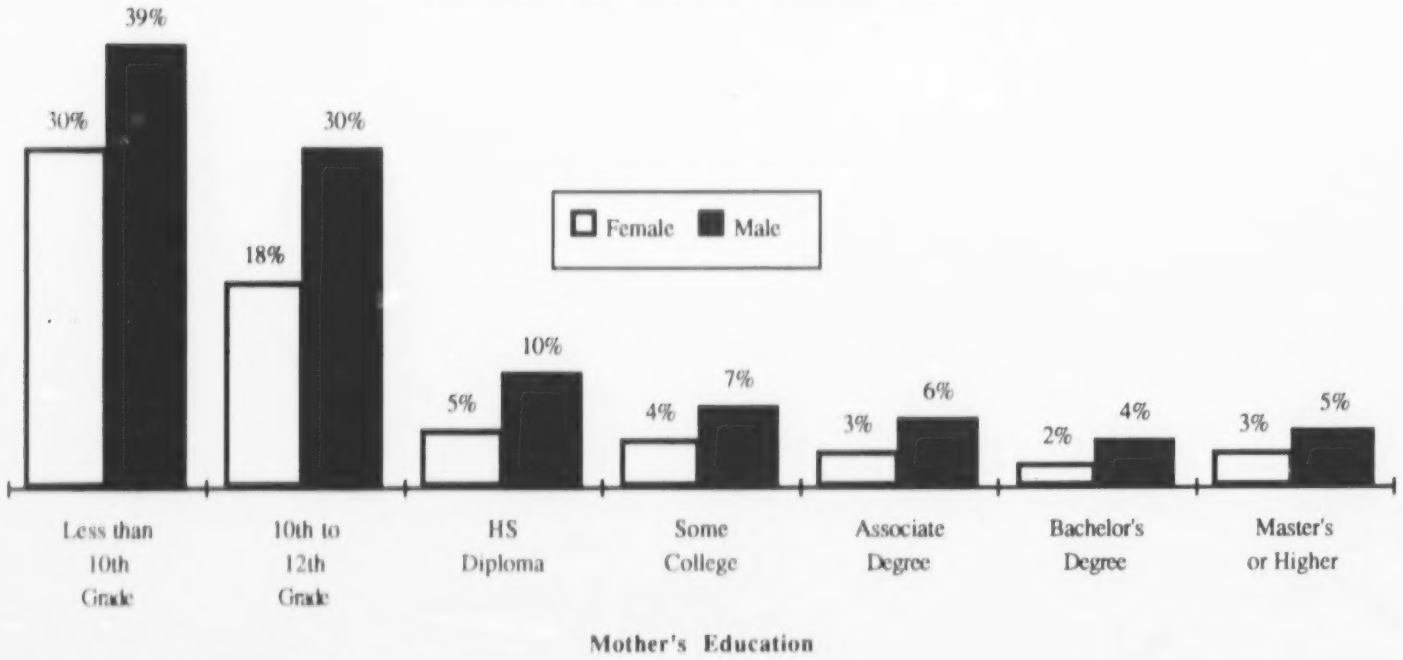
High School Dropout Rates of Dependent Pennsylvanians Age 18 to 23 by Gender and Family Income: 1990



Source: Pennsylvania Public Use Microdata Sample (1990)

Parental education is also strongly correlated with high school completion. In 1990, for example, a dependent whose mother completed a bachelor's degree was six times more likely to finish high school as one whose mother dropped out before the twelfth grade.

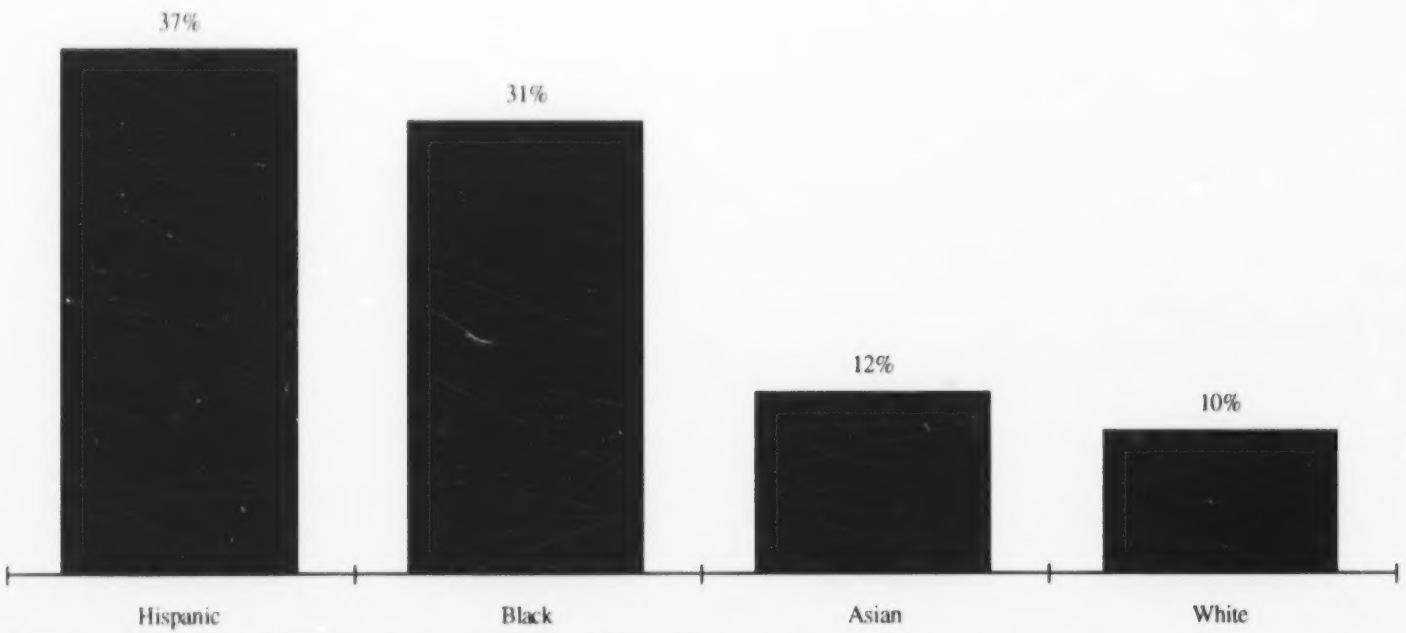
High School Dropout Rates of Dependent Pennsylvanians Age 18 to 23 by Gender and Mother's Education: 1990



Source: Pennsylvania Public Use Microdata Sample (1990)

In Pennsylvania, ethnicity or ancestry exerts a strong influence on high school graduation rates. For example, even after controlling for family income, high school graduation rates are lower for black and Hispanic males than for white males. This disparity, which affects both low- and middle-income black and Hispanic families, threatens to undermine within one generation the extraordinary achievements of parents who have overcome the odds against economic mobility. Conversely, Pennsylvania's Asian population has a consistently high graduation rate, regardless of income. More than 90 percent of Asian dependents from families with incomes of less than $15,000 go on to attend college by age 23, compared to 40 percent for whites.

Estimated Cumulative Public Secondary Education Dropout Rates by Racial/Ethnic Group

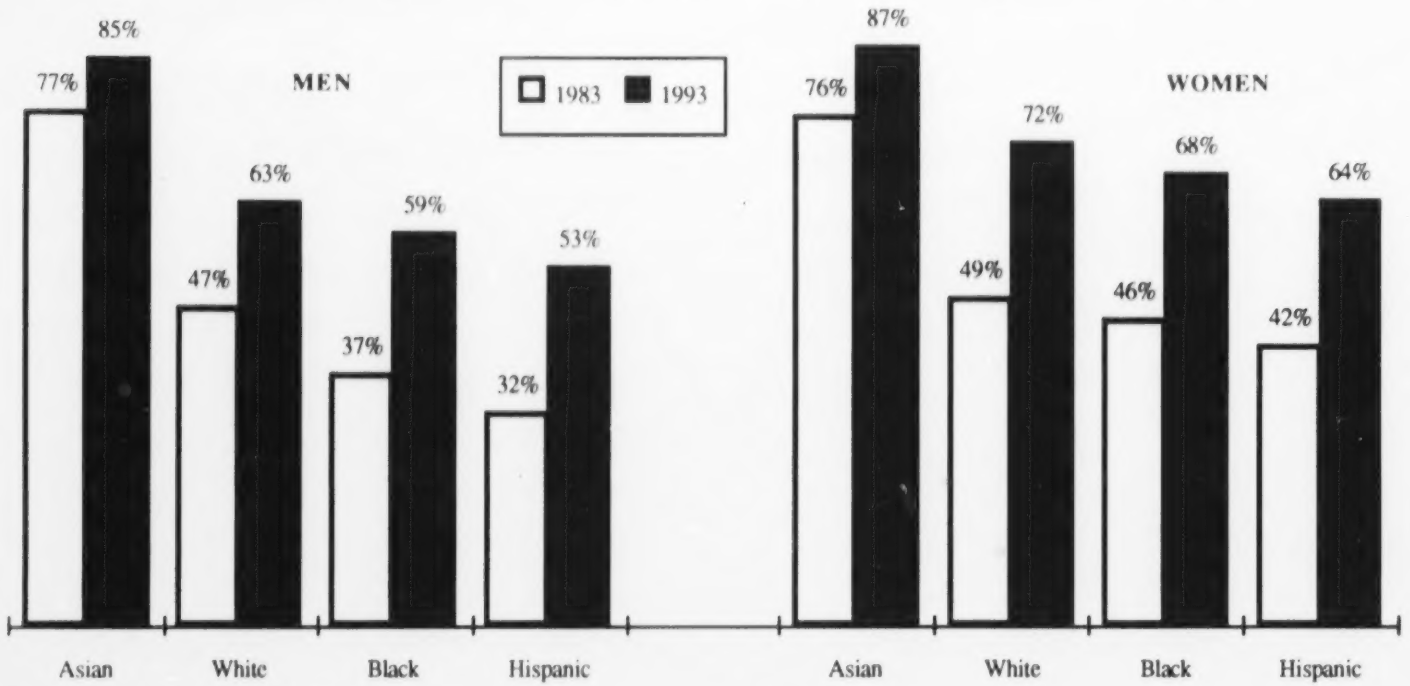


Source: Pennsylvania Department of Education. Based on 1993 high school dropout rates.

College Aspirations

Between 1983 and 1993, the proportion of Pennsylvania high school graduates who planned to attend college increased dramatically from 48 percent to about 67 percent. Although the number of high school graduates declined 25 percent during the decade, 82,000 Pennsylvania high school graduates planned to attend college in 1993, compared with 77,000 in 1983. Nationally, the percentage of high school graduates enrolled in college has steadily increased from approximately 26 percent in 1970 to 42 percent today. While the factors influencing a student's motivation to attend are diverse, the linkage between a college degree and a better job explains much of the growth.

Anticipated College-Bound Rates for High School Graduates by Race and Gender

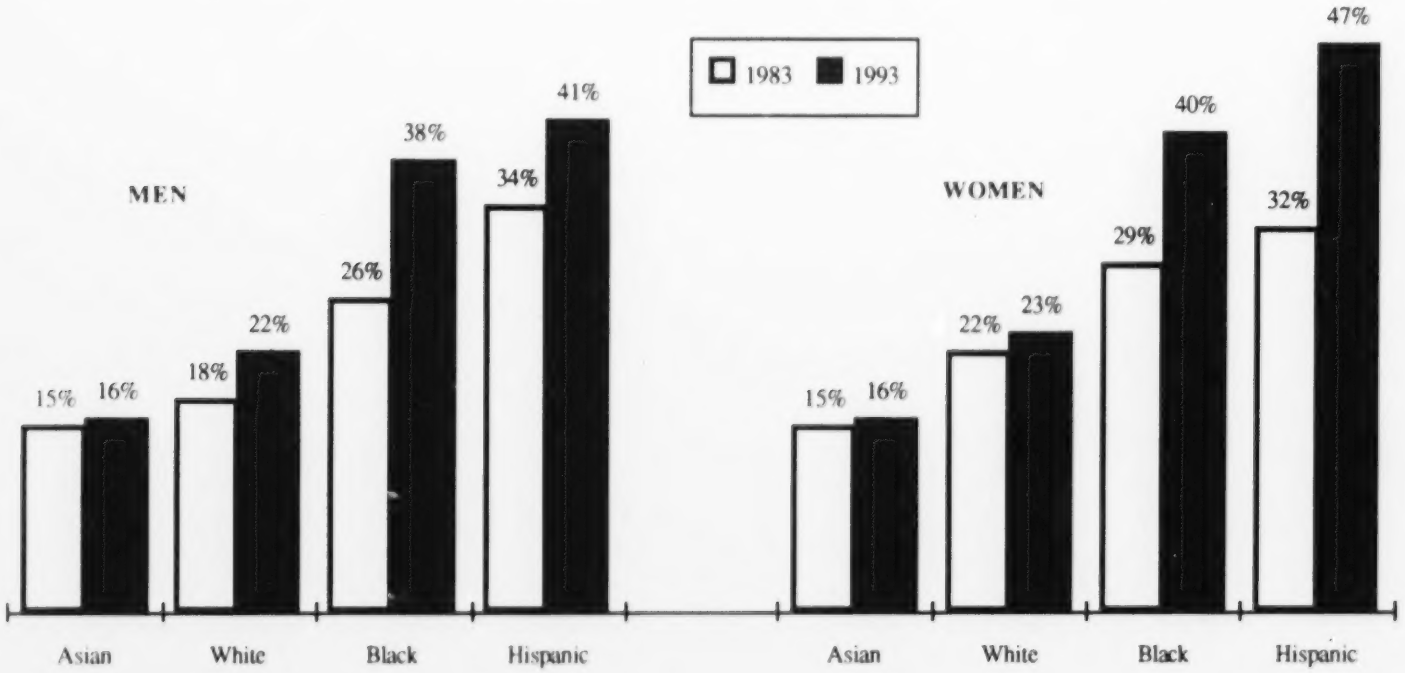


Source: Pennsylvania Department of Education

Aspirations by Institution Type and Location

While virtually all categories of high school students have shown greater interest in attending college, their specific plans differ considerably by racial group. In 1993, nearly 40 percent of all black and Hispanic high school graduates planned to attend a two-year college, up from 30 percent a decade earlier. By contrast, fewer than one-in-four whites and one-in-six Asian high school graduates planned to attend two-year colleges in 1993.

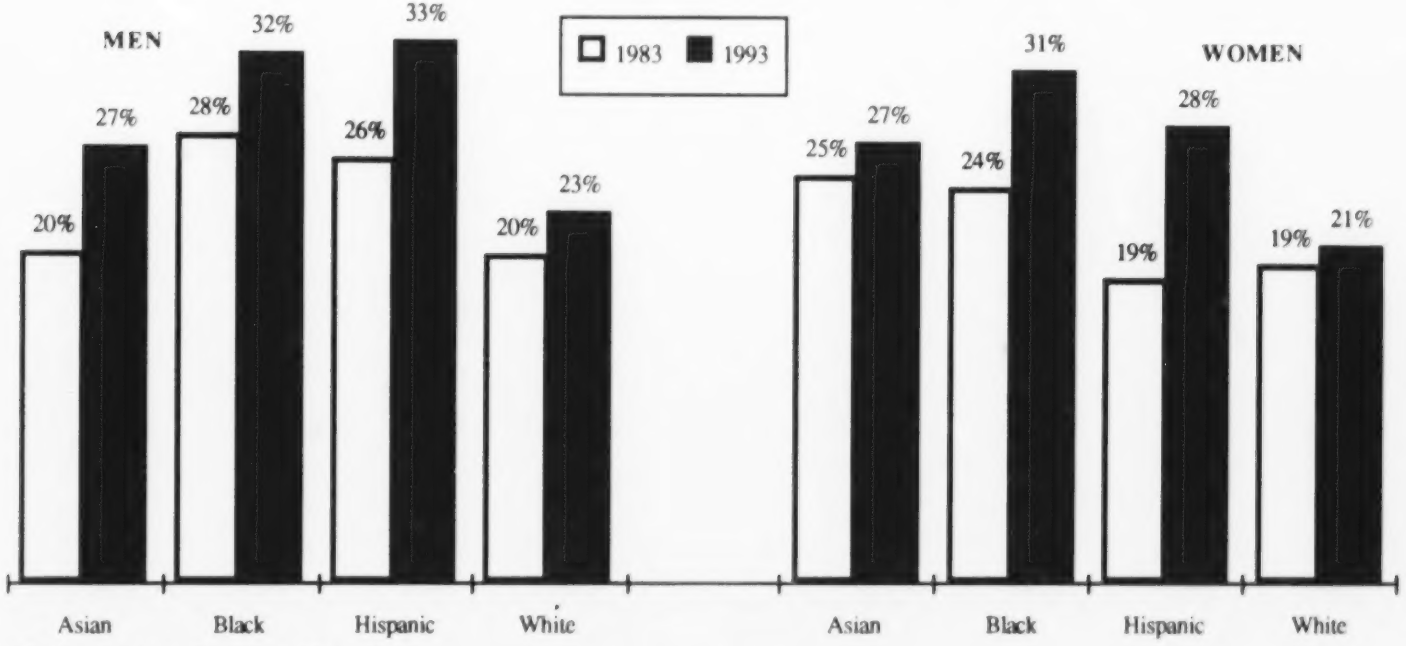
College-Bound High School Graduates Planning to Attend Two-Year Institutions



Source: Pennsylvania Department of Education

Among students of color planning to enroll at four-year institutions, there is a growing tendency to attend outside Pennsylvania, which is largely the result of increased competition among institutions nationally to recruit and enroll minority students.

College-Bound High School Graduates Planning to Attend Four-Year Institutions Outside Pennsylvania

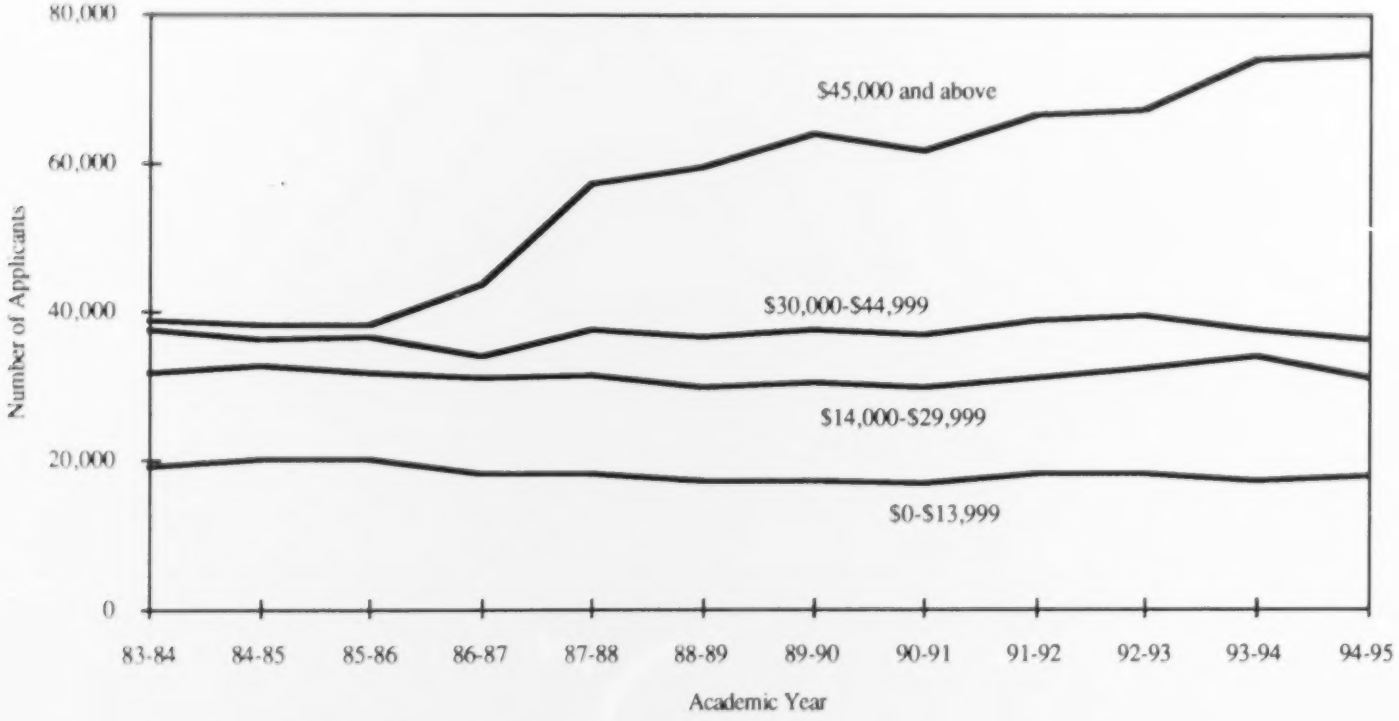


Source: Pennsylvania Department of Education

College Enrollment

Between 1983 and 1993, the proportion of Pennsylvania high school graduates planning to attend college increased by nearly 20 percent, and first-time freshman enrollment increased by nearly 10 percent. In other words, a significant number of high school graduates who planned to attend college were able to fulfill their aspirations. During the same period, the number of full-time, dependent students applying for financial aid grew by nearly 28 percent. However, for families with incomes under $15,000, the number of grant applicants remained flat, which suggests that the increase in full-time college participation was fueled primarily by middle- and upper-middle-income students.

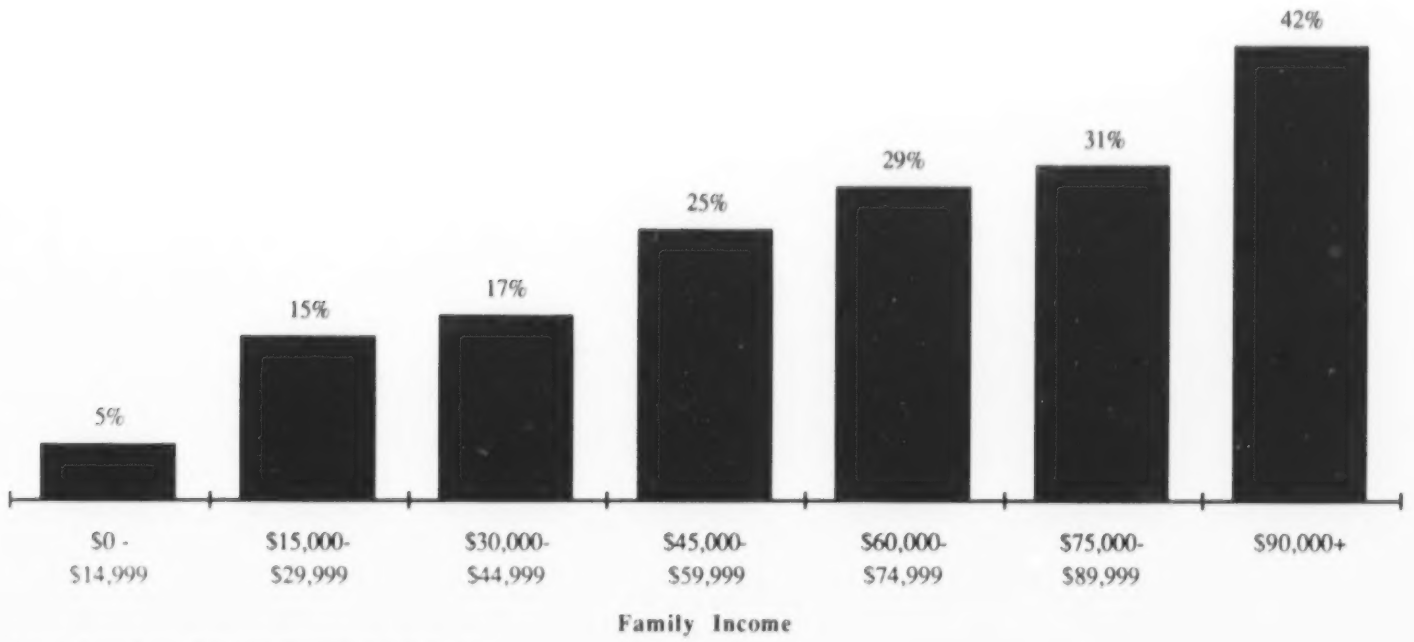
Pennsylvania State Grant Applications by Family Income in Constant Dollars



Source: Pennsylvania Higher Education Assistance Agency

Due to the differences in high school graduation rates, plans to attend a four-year institution, and the ability to attend college full time, there is an enormous disparity in education attainment by family income. By age 23, a middle-income dependent is four to five times more likely to earn a bachelor's degree than a low-income dependent.

Pennsylvania Dependents Age 23 Who Have a Bachelor's Degree by Family Income: 1993

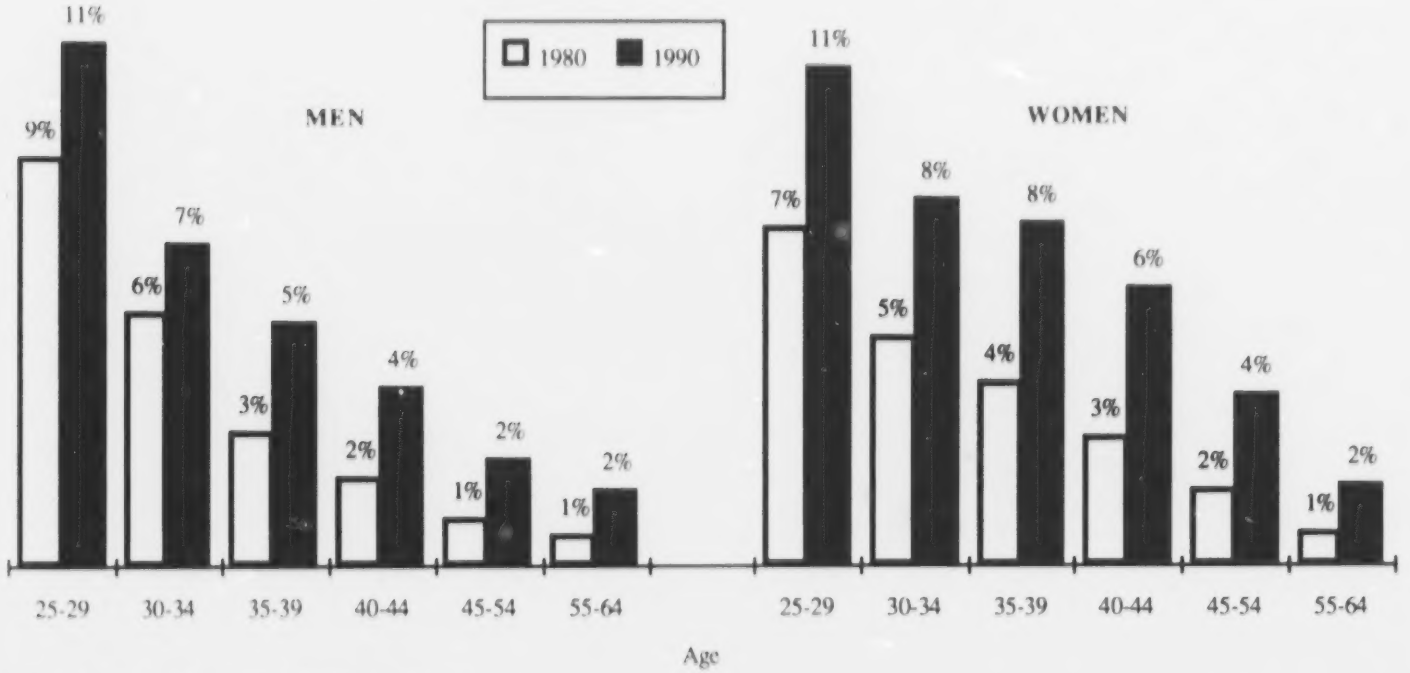


Source: Pennsylvania Public Use Microdata Sample (1990)

Adult College Participation Rates

Between 1980 and 1990, Pennsylvania's adult college participation rate increased by more than 50 percent, and for men and women age 35 and older, the proportion attending college more than doubled. While college participation increased for men and women of all ages, women outpaced men. Notably, women between the age of 35 and 54 are nearly twice as likely to be enrolled in college as men. In large part, adult women, who trail men at the associate's and bachelor's degree levels, are striving to catch up. However, even after controlling for age and education, women still demonstrate a greater tendency to continue their education.

College Participation Rates of Pennsylvanians Age 25 to 64

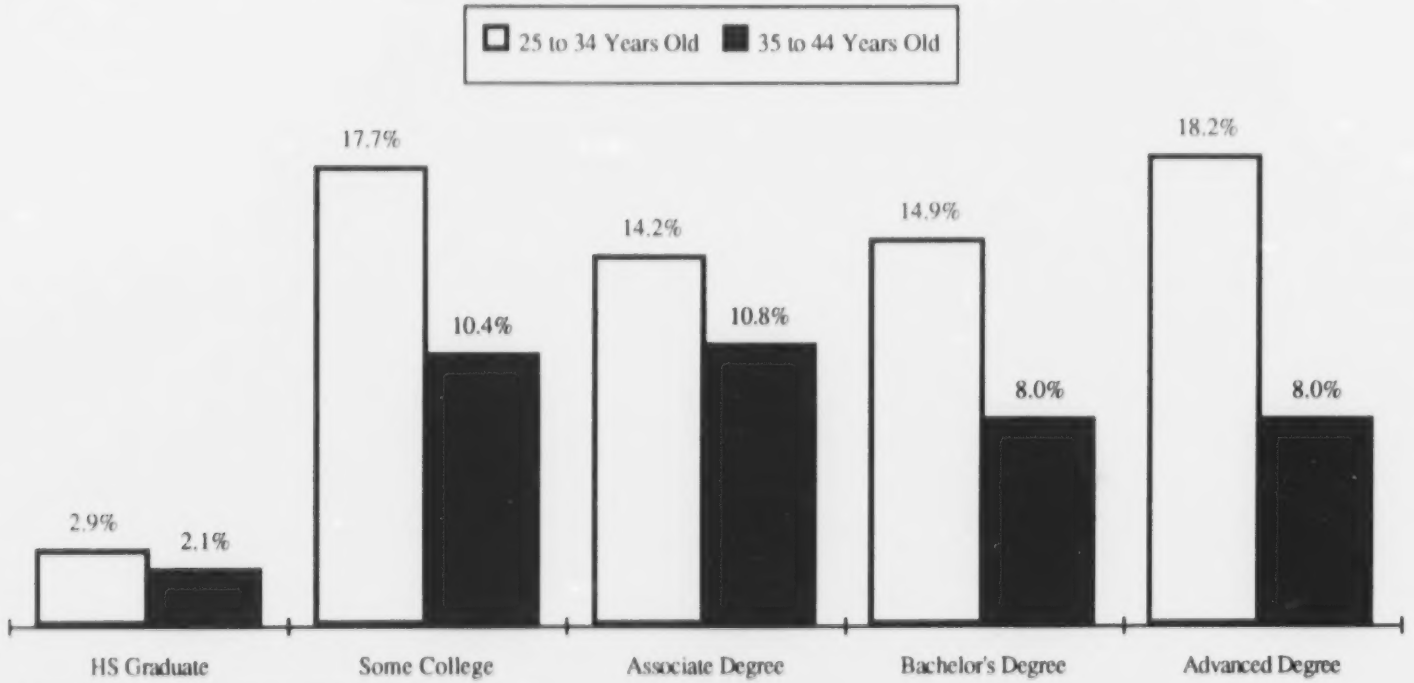


Source: Pennsylvania Public Use Microdata Sample (1990)

Adult Participation Rates by Education

Although more adults are attending college, the chances of attending diminish greatly if a person has not gained at least some college experience by age 29. In 1990, fewer than one-in-fifty 30 year olds who had only a high school education were enrolled in college. By contrast, nearly one-in-five 30 year olds who had at least some college, an associate's degree, or a bachelor's degree were enrolled. Moreover, among younger adults, the higher the level of education, the more likely they are to be enrolled.

Adult College Participation Rates by Education and Age Group

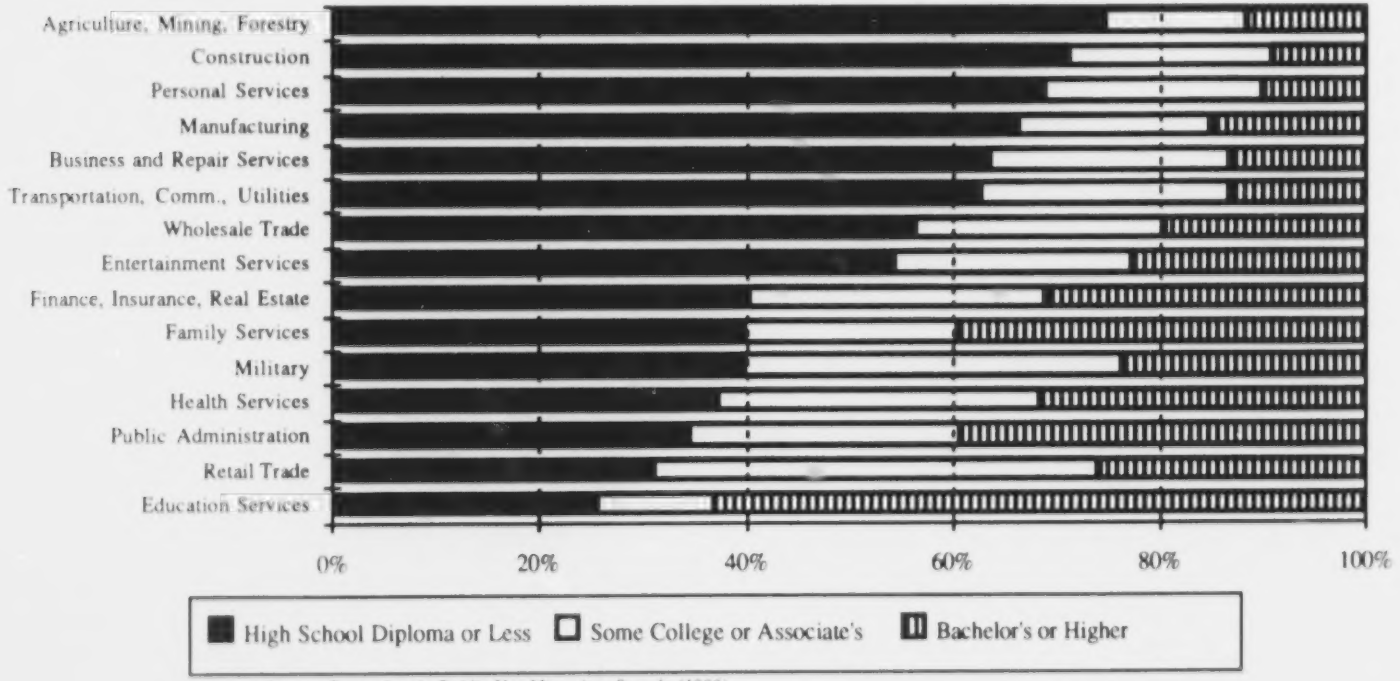


Source: Pennsylvania Public Use Microdata Sample (1990)

Pennsylvania's Occupation-Industry Matrix

The employment of individuals who have a bachelor's degree or higher is largely concentrated among relatively few major industry sectors. In 1990, 50 percent of all Pennsylvanians with a bachelor's or advanced degree were employed by three major industry groups: health, education, and public administration. By contrast, 35 percent of those with a high school diploma or less were employed in two major sectors: manufacturing and retail trade.

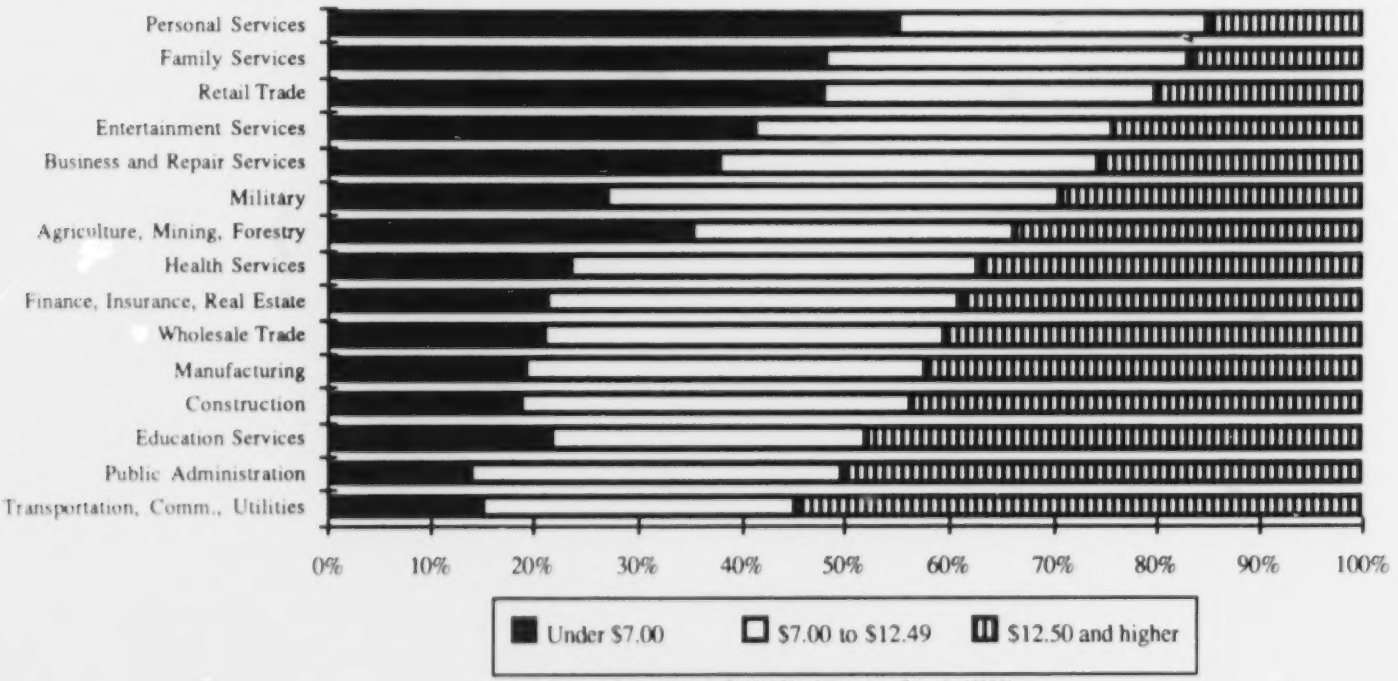
Distribution of Pennsylvania Industry Employment by Education: 1990



Source: Pennsylvania Public Use Microdata Sample (1990)

In 1989, 38 percent of employed Pennsylvanians earned more than $12.50 an hour. Among those with no college education, however, fewer than 27 percent earned $12.50 an hour. While education explains only part of the variation among industry wage structures, the influence of education is increasing due to technological advancements and international competition.

Average Hourly Earnings of Those Employed by Pennsylvania Industries



Source: Pennsylvania Public Use Microdata Sample (1990)

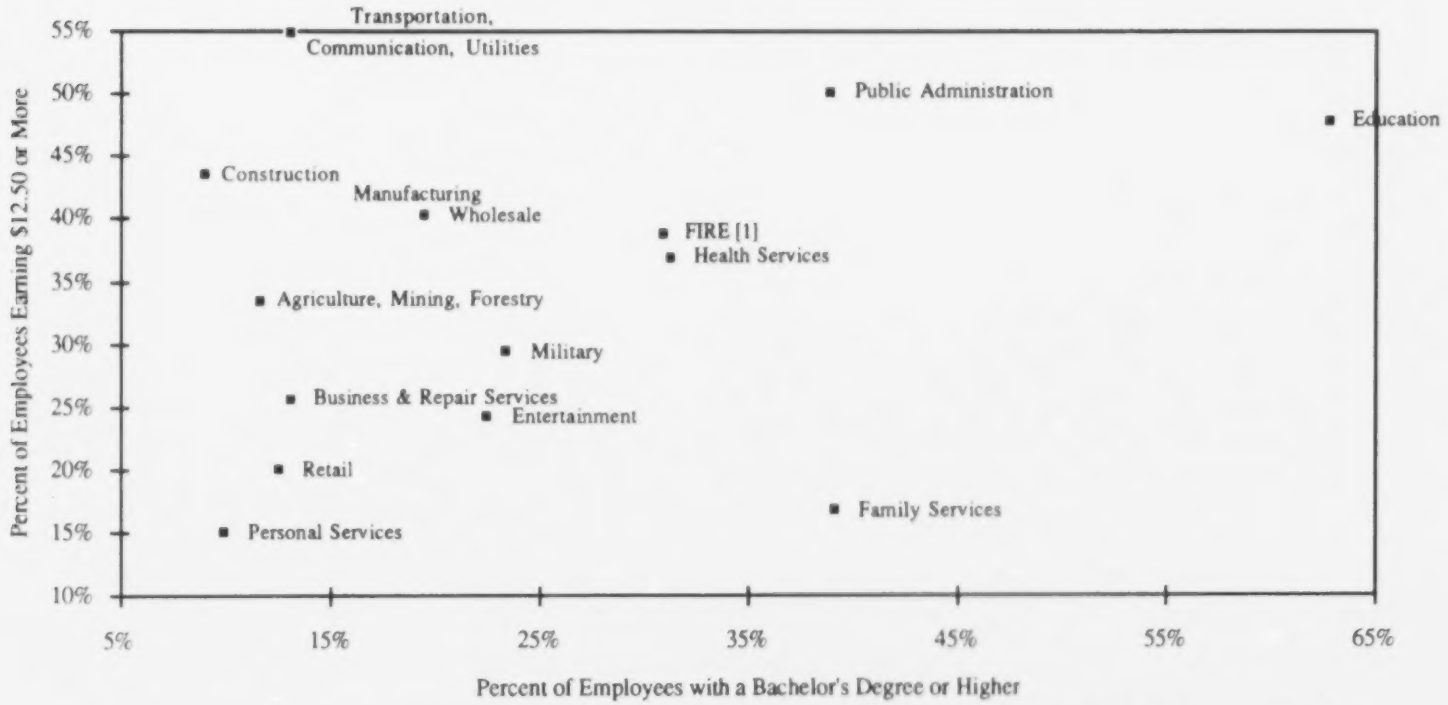
61

62

While most states are experiencing changes in employment composition, the shift is especially challenging for Pennsylvania, because the state's employment base is so heavily concentrated in the goods producing and distributive sectors. In 1989, for example, only 15 percent of Pennsylvania's 1 million manufacturing workers had a bachelor's degree or higher, but more than 42 percent earned at least $12.50 an hour. Similarly, fewer than 12 percent of the state's 240,000 transportation, communication, and public utilities (TCPU) workers had a bachelor's degree or higher, yet 55 percent earned more than $12.50 an hour. Since 1989, however, manufacturing employment has dropped nearly 10 percent, and the payroll per TCPU worker has fallen at an annual average rate of 1 percent.

Employment and/or income declines in these industries are literally pulling the rug from under Pennsylvania's blue-collar, middle-class workers. The decline in income for these families has been exacerbated by the limited capacity of other industries to hire these individuals at anything close to their former wages.

Relationship in Pennsylvania between High-Wage Employment and Education by Industry: 1989

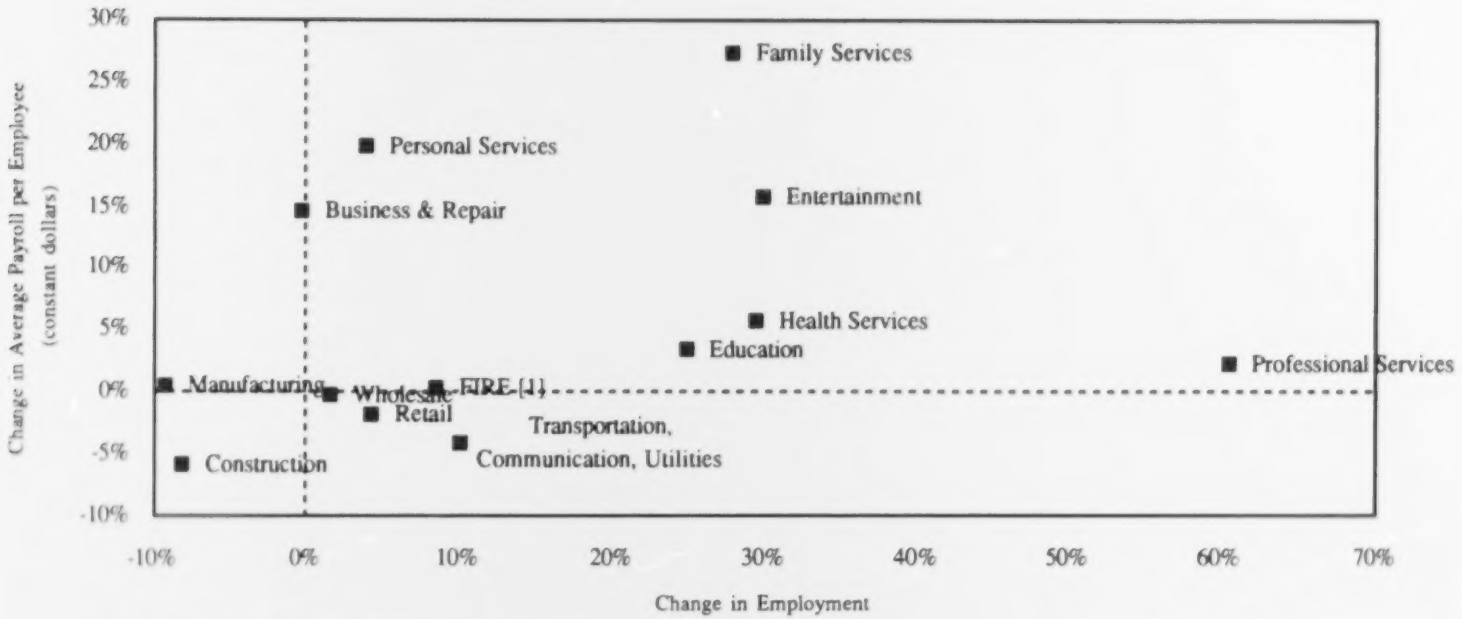


Source: Pennsylvania Public Use Microdata Sample (1990)

[1] Finance, Insurance, and Real Estate

Pennsylvania's employment shift has benefited those in occupations that require at least some college. Since 1987, nearly all of the industries in Pennsylvania that employ more highly educated workers have raised average earnings and added more jobs. For example, health, education, family, and professional services have all added jobs at an average annual rate of 2 percent and have all increased their average payroll per worker at rates well above inflation.

Change in Pennsylvania Employment and Average Payroll per Employee from 1987 to 1992 by Industry



Source: County Business Patterns (U.S. Census Bureau)

Meeting the Challenge

Participation and attainment are two sides of the same coin. Those who have attained at least some college education are the most likely to receive additional instruction, either on their own or through their employers, which also induces future participation by other family members. Once individuals begin college, they become the most likely candidates for life-long learning. In other words, education is a contagious process that creates its own demand. Unfortunately, however, large educational attainment gaps exist among Pennsylvania's economic classes, a disparity that must be addressed if we are to expand educational opportunities for the state's existing population and spur greater participation by future generations.

While this study is not intended to provide a detailed education policy prescription for the Commonwealth of Pennsylvania, on the basis of the research, we believe six strategies merit further consideration by legislators, educators, employers, and families:

- **Establish State-Wide Education Objectives and Determine the Level of Investment Needed to Achieve Them**

The Commonwealth should establish measurable education objectives that consider outcomes not only in the aggregate but among various segments of the state's population as well. Without established state-wide goals, Pennsylvania cannot build into its legislative process a system of accountability or a strategic vision.

After establishing education goals, the state must determine what level of investment is necessary to ensure successful outcomes. Frequently, policy makers tend to focus too much on the average cost per student rather than desired educational outcomes. For example, investing in student services, such as academic advising, remedial centers, or career placement, will raise the average cost per student, but may also substantially increase the chances of educational success, which will benefit the student and the state in the long run.

- **Gather and Disseminate Critical Information**

Educators, students, employers, and policy makers require better information. Current labor market information is inadequate for education planners and policy makers who must decide what academic programs should be offered or whether students will be able to pay off their loans. An information infrastructure that will provide educators with a better understanding of the skills employers require and will better measure the economic outcomes of students cannot be built at an institutional level, nor can it be achieved through existing federal data collection efforts. The scale and scope of such an undertaking requires collaboration among education institutions and employers, with state government potentially playing a crucial coordination and dissemination role.

- **Reexamine Higher Education's Price Curve**

As the primary underwriter of public higher education, Pennsylvania must establish a price curve and subsidization strategy that will maximize the state's return. By setting prices too high for low-income families, students may be unable to attend the institution that best meets their needs or may be required to prolong their completion time. By setting prices

too low for high-income families, who could afford to pay more, the state fails to adequately leverage its higher education investment.

- **Provide Investment Incentives for Families**

The relationship between success at the elementary and secondary school levels and subsequent education reaffirms the family's role as the fundamental and primary target of education investment. Policies that enhance early educational success are crucial to the long-term demand for postsecondary education. Also, the state should consider a college savings income tax credit and other measures that would encourage families to invest in their children's education.

- **Provide Incentives for Employers and Develop an Education/Labor Force Policy**

Because the recruitment, retention, and ongoing development of a highly skilled labor force is critical to the state's long-term economic position, employers should be induced to provide worker training. For example, an investment credit for tuition reimbursement or human resource development would treat human capital investments the same as physical plant investments. Also, Pennsylvania should consider an integrated education/labor force development policy that establishes shared responsibilities among state and local governments and private industry for sustaining economic growth through educational investments.

- **Foster Creative Solutions and Facilitate Exchange among Institutions and Sectors**

Elementary, secondary, and postsecondary institutions are all involved in efforts to improve education. However, these institutions are often severely restricted by accrediting and professional bodies; local, state, and federal regulations; and their own operative cultures. These restrictions should be eliminated where possible and funding should be considered for experimentation and for the establishment of a clearinghouse that would evaluate outcomes and disseminate information about new educational approaches.

In combination, these six policy thrusts would redefine the Commonwealth's education landscape, positively influence wider participation in postsecondary education, and ensure greater economic and social mobility for Pennsylvania's citizens.

Appendix A

U.S. Bureau of the Census, 1990 Census of Population, *Social and Economic Characteristics: Pennsylvania*, Section 3 of 3, page B-4:

"From 1840 to 1930, the census measured educational attainment by means of a basic literacy question. In 1940, a single question was asked on highest grade of school completed. In the censuses of 1950 through 1980, a two-part question asking highest grade of school attended and whether that grade was finished was used to construct highest grade or year of school completed. For persons who have not attended college, the response categories in the 1990 educational attainment question should produce data which are comparable to data on highest grade completed from earlier censuses.

"The response categories for persons who have attended college were modified from earlier censuses because there was some ambiguity in interpreting responses in terms of the number of years of college completed. For instance, it was not clear whether 'completed the fourth year of college,' 'completed the senior year of college,' and 'college graduate' were synonymous. Research conducted shortly before the census suggests that these terms were more distinct in 1990 than in earlier decades and this change may have threatened the ability to estimate the number of 'college graduates' from the number of persons reported as having completed the fourth or a higher year of college. It was even more difficult to make inferences about postbaccalaureate degrees and 'associate' degrees from highest year of college completed. Thus, comparisons of postsecondary educational attainment in this and earlier censuses should be made with great caution."

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